A Stewardship License for Alberta Anglers:

Increasing the Effectiveness of Special Regulations through Angler Education

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The brook trout and bull trout photographs on the cover appear courtesy of Dean Baayens and Kevin Egan, respectively.

During the last 30 years, every important coldwater state has designated trout streams and lakes for catch-and-release only fishing. Actual results to the quality of angling have varied; so has the acceptance of special regulations among anglers. Overall, however, one of the impressive changes in trout management has been an increasing willingness of the angling public to watch the trout brought to hand swim away. In fact, some anglers have become so strident in favor of catch-and release fishing that they will behave in no other way – even in circumstances where letting go of plentiful hatchery trout makes no real biological sense. Moreover, some of these zealots want <u>all</u> trout fisherman to fallow their lead, and think poorly of those who don't. Because most licensed anglers prefer to keep at least some of the fish they catch, inevitable conflicts have developed. The outcomes of these often emotional battles have, unfortunately, sometimes been determined more by political arm-twisting than sound biology. Fraudulent implementation of special regulations is no better than fraudulent reasons for stocking. Worse, their future application to achieve biologically measurable results may be compromised. A major lesson of the last three decades is that special regulations definitely work – but only in the right places, for the right reasons.

----- Robert J. Behnke (1989, p. 18)

EXECUTIVE SUMMARY

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Changes to the Alberta Eastern Slopes angling regulations in 1998 (catch-and-release, reduced bag limits and increased minimum size limits) were designed to provide more protection for stream salmonids in general, and native species in particular. While these regulations have the potential to provide additional protection for native species, they may not succeed when anglers are unable to correctly identify their catch. Furthermore, they may be overly restrictive for anglers that are competent in fish identification and who could justifiably be allowed to harvest more exotic species without negative ecological implications, thus providing a significant recreational experience benefit. The purpose of this study was to examine the alternatives for an expanded fishing license system that includes the option of a 'stewardship license' for anglers who demonstrated proficiency in fish identification as well as knowledge of basic fisheries management and key regulations. Such a 'stewardship license' could be required for anglers to harvest any fish from designated Eastern Slopes streams and could also allow qualified anglers to harvest 'bonus' brook trout from selected Eastern Slopes steams.

An international review of angling regulations and licenses found relative uniformity in the approach to managing recreational freshwater fisheries, although the review demonstrated significant variation in licensing costs for freshwater angling in North America. Alberta's angling license fees are near the North American average, but are

lower than the nearest neighbouring provinces and states. Special regulations are implemented by most jurisdictions where stream salmonids occur. Only two countries (Germany and Austria) were found to have mandatory angler education programs. Most other jurisdictions have some educational materials made available to anglers, especially through the Web. There is growing emphasis on the protection and management of native fish. The use of angling as a management tool to suppress brook trout is being applied in several western states and provinces through the use of increased or 'bonus' bag limits. There are currently no special licenses or fees associated with increased brook trout harvest in these jurisdictions.

The report recommends that the Eastern Slopes regulation changes of 1998 undergo a thorough ecological and human dimensions review of effectiveness. Findings from the evaluation should be communicated to the Alberta public and the angling constituency in particular. Any changes to the regulations should be driven by the lessons learned from the review and be part of the adaptive management cycle. Public involvement in considering any changes is essential. There may be some skepticism from the public arising from recent changes requiring barbless hooks.

There are few international precedents for mandatory angler education as a condition of obtaining a fishing license. In contrast, mandatory hunting and firearm-safety education is well-established in North America. Since many anglers lack adequate fish identification skills, improved education could help to make special regulations more effective. The report recommends that Alberta expand the materials available for angler education and make such material available through a wide array of venues. Furthermore, the report recommends the creation of incentives that encourage anglers to learn more about fish identification, ecology and management. Anglers passing an exam would be eligible for a 'stewardship license' that could also include eligibility (and encouragement) to harvest an increased number of brook trout from selected streams.

Initially, the stewardship license would be offered at the same price as the regular annual permit for residents. However, at such time as the annual permit fee is increased, it is

recommended that the ‘stewardship license’ be offered at a lower rate as an added incentive for participation. Alberta should consider making a ‘stewardship license’ a requirement for the harvest of any fish from designated streams. The existing WIN card system could be used to track anglers eligible for the ‘stewardship license’. Anglers purchasing a stewardship license would receive a highly visible badge to be worn while fishing. This would make it easier for Fish and Wildlife Officers to enforce the regulations and would also help to raise awareness of the program among other anglers. The implementation of an expanded brook trout suppression program could include the promotion of the phrase “Red on Blue it’s for You” to complement the “No Black Put it Back” slogan currently in use for bull trout.

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1. INTRODUCTION

1.1 Study Purpose

The purpose of this project is to examine the potential for developing and implementing a 'stewardship license' for Alberta's Eastern Slopes that includes a mandatory requirement for anglers to demonstrate: 1) proficiency in fish identification and 2) a knowledge of key regulations and fisheries management. The stewardship license could include a provision to allow anglers to harvest a 'bonus' number of brook trout *Salvelinus fontinalis* from selected streams. The approach is to examine the regulations and management approaches from a wide array of other jurisdictions for precedents and experience. The review of licensing systems also includes an examination of licensing costs in North America in order to make meaningful comparisons to Alberta. This information is then used to make recommendations to Alberta Fish and Wildlife Division, regarding potential approaches to native fish protection.

1.2 Brief History of North American Recreational Fisheries Management for Freshwater Salmonids

The history of coldwater salmonid fisheries management in North America is marked by significant changes in philosophy and practice (Sigler and Sigler 1990). The first period, prior to the mid-19th century, was conspicuous by growing concerns of over-exploitation and the imposition of the first seasonal closures and harvest limits. The next phase, from 1870 through the early 1900s, has been called "the golden age of introductions" (Griffith 1993, p. 417). Species from within North America were transplanted to regions well beyond their native ranges (e.g., brook trout, MacCrimmon and Marshall 1969; and rainbow trout *Oncorhynchus mykiss*, Behnke 2002) and European brown trout S*almo trutta* made their way into streams across the continent (MacCrimmon and Marshall 1968). "Nonnative trout have been successfully introduced into a variety of freshwaters and represent one of the most widespread invasions of nonnative species on the planet" (Dunham, et al. 2004, p. 18). The ecological effects of introductions were further exacerbated by the use of nonspecific fish poisons that were sometimes

used to remove native species prior to introductions (Rinne and Janisch 1995; Schindler 2000) and the systematic persecution of native species considered to be 'junk fish' by anglers (Colpitts 1997). Simon and Townsend (2003) review the impacts of introduced fish on freshwater ecosystems across ecological levels of organization. The effects of non-native invasion range from individual and genetic effects through to trophic cascades and other ecosystem processes.

Following a decline in catch-rates, the mid-20th century was characterized by a proliferation of hatcheries to support massive introductions and augmentations. It was not until the 1970s that questions regarding the impacts of introducing exotic fish began to influence meaningful change in fisheries management. Today, the proliferation of bio-invasive fish is recognized as a leading cause of native species decline and among the most challenging factors in the future preservation of native salmonids[1] (Miller et al. 1989; Minkley and Deacon 1991; Warburton 1998; Gido and Brown 1999; Behnke 2002; Cowx 2002; Quist and Hubert 2004; van Zyll de Jong et al. 2004). In the streams of Alberta's Eastern Slopes, the native bull trout *Salvelinus confluentus* and cutthroat trout *Oncorhynchus clarkii* have been detrimentally affected by the cumulative effect of anthropogenic factors, including the introduction and expansion of non-native fish (Brewin 1999).

1.3 Effect of Introductions on the Native Trout/Char in Alberta's Eastern Slopes Streams

Bull trout, the only char native to Alberta's Eastern Slopes streams, suffered precipitous declines as a result of over-exploitation, persecution, habitat degradation and interaction with non-native species (MacKay et al. 1997; Post and Johnston 2002). The species is particularly susceptible to over-exploitation due to low reproductive rates combined with high catchability (Rieman and McIntyre 1996; Berry 1997; McCart 1997; Behnke 2002; Post et al. 2003). Bull trout are also sensitive to altered water and sediment regimes and are therefore recognized as an indicator species for coldwater ecosystem health (Rieman and McIntyre 1993; Fausch and Young 2004).

The introduction of brook trout into Alberta's East Slopes streams has been deleterious to bull trout. Bull trout have been extirpated from approximately 70% of southern Alberta streams where brook trout have been introduced (Fitch 1997). Direct competition (Ratliff and Howell

[1] Global warming is another factor that is beyond the scope of the current report, but is predicted to cause significant changes to hydrological systems and their aquatic communities (Keleher and Rahel 1996; Schindler 2001; O'Neal 2002).

1992; Gunckel et al. 2002) and hybridization (Roberts 1982; Leary et al. 1993; Kitano et al. 1994) are thought to be significant mechanisms in the replacement of bull trout by brook trout. In 1998, bull trout were added to the U.S. Endangered Species list as 'threatened' and they hold similar status across their extant range. The species is classified as a 'species of special concern' in Alberta.

Cutthroat trout were once the mostly widely distributed of any North American trout species. Today, most of the remaining subspecies have been reduced to <5% of their original distribution (Behnke 2002). Westslope cutthroat *O. c. lewisi*, the subspecies of cutthroat native to Alberta, co-evolved with bull trout and mountain whitefish *Prosopium williamsoni* in the headwater streams of western North America. Similar to bull trout, westslope cutthroat trout require high quality cold water and are extremely susceptible to the fine sedimentation often associated with poor land-use practices (Liknes and Graham 1988; Van Eimeren 1996; Shepard et al. 1997). Although habitat loss, habitat degradation and exploitation have all been significant factors in the decline of cutthroat trout, Behnke (2002) states that interactions with introduced species have been the most detrimental.

Cutthroat trout are replaced by brook trout through mechanisms that are poorly understood, but likely include interference competition (displacement) and replacement. The latter occurs as a result of a higher susceptibility of cutthroat trout to angling pressure compared to non-native species (Griffith 1988; Shepard et al. 1997; Adams et al. 2002; Paul et al. 2003; Peterson and Fausch 2003). The degree of susceptibility to invasion may be a function of habitat variables such as elevation, gradient, water temperature and in-stream structure (Fausch 1989; De Staso and Rahel 1994; Kennedy et al. 2003; Peterson et al. 2004; Shepard 2004). Successful invasion by exotics may also be influenced by the timing of spawning and fry emergence and flow/temperature regimes (Fausch and Young 2004). Fall spawning char may gain a competitive advantage over spring spawning cutthroat trout as the former may be less affected by spring high flow events (Latterell et al. 1998). Peterson et al. (2004) conclude that, if cutthroat trout are to persist, brook trout must be eradicated or regularly suppressed in streams where the two species are currently sympatric.

Cutthroat trout also hybridize freely with non-native rainbow trout. The result is significant introgression (Allendorf and Leary 1988; Rubidge et al. 2001; Hitt et al. 2003). Pure genetic strains of westslope cutthroat trout are estimated to occur in only 2-4% of their historic stream

distribution (McIntyre and Rieman 1995). Introgression leads to decreased fitness and the loss of unique genetic-behavioural adaptations that have evolved in response to the environmental factors. Due primarily to the threat of introgression, it has been argued that the westslope cutthroat trout may be the most endangered salmonid in Canada (Rubidge et al. 2001).

1.4 Current Approaches to Recreational Fisheries Management

Today, management of coldwater fisheries is characterized by emphasis on protecting wild trout and their native habitats (Griffith 1993; Rahel 1997). This shift in managerial attitude requires concomitant development of new tools such as restoration methods and special regulations (American Fisheries Society 1995). "Trout resource management has benefited from a system of special harvest regulations. Special regulations, when properly designed, marketed, and enforced, can increase the productivity of waters by controlling use patterns that can threaten the local ecosystem and the resident biological community" (Epifanio and Lindloff 1999, p. 41).

The removal of non-native fish species through a variety of means, including gillnetting, trapping, toxicants, electrofishing and selective angling, has also become a critical topic for management consideration (Larson, Moore and Lee 1986; Cowley 1987; Gresswell 1991; Varley and Schullery 1995; Meronek et al. 1996; Thompson and Rahel 1996; Knapp and Matthews 1998; Trout Unlimited Canada 2000; Stelfox et al. 2004; U.S. Department of Energy 2004). It is generally recognized that such efforts should be secondary to habitat protection and that suppression of competing non-native species in selected areas is more realistic than complete eradication over large areas (Montana Bull Trout Scientific Group 1996). One of the primary concerns in applying any of these methods is the potential for negative effects on non-target fauna. A review of 250 fish control projects reported a success rate of less than 50% and concluded that fish "control projects should include critical evaluation of assumptions and of suspected causes of problems, explicit rationale and objectives, and pretreatment and long-term post treatment study" (Meronek et al. 1996, p. 63).

Contemporary approaches to freshwater fisheries management stress the importance of ecological integrity and the quality of angling experience rather than simply trying to maximize the quantity of fish harvested. However, the angling public is not always in concordance with fisheries managers and the shifting emphasis towards native species has created challenges and conflicts.

The introduction of non-native species to North American waters was largely a response to angler preference for more desirable 'sporting' species. Colpitts (1997) describes the desires of early 20th century Alberta anglers for "handsomer, gamier and better classes of fish" (p. 31) and he labels the ensuing management practices 'stream eugenics'. Recent angler surveys have reported either little preference among salmonid species or a preference for non-native species over cutthroat trout (Reid 1989; McFarland and Brooks 1993; Thompson 1997; McCollum et al. 1999; Gelwicks et al. 2002; Quist and Hubert 2004). There is also concern expressed by some anglers that more restrictive regulations will decrease their enjoyment of the fishery. Quist and Hubert (2004) conclude:

> Cutthroat trout declines are of little concern to much of the public because they are valued similarly to non-native salmonids, and non-native salmonid species frequently have higher recreational values. Due to the low values placed on cutthroat trout relative to non-native salmonid species, net economic benefits of preserving cutthroat trout are equal to or less than those for non-native salmonids (p.303).

At the same time, there are many angling and conservation organizations that are promoting the protection of native species (e.g., Trout Unlimited Canada 2000, The Western Native Trout Campaign 2005) and, as with catch-and-release, the angling public has shown a remarkable capacity to embrace new attitudes. The changing attitudes toward bull trout have also been remarkable: "in anglers' and provincial and state fisheries biologists' eyes the bull trout has gone from 'trash fish' to 'trophy fish' in less than two decades" (McPhail and Baxter 1996, p. 22). It is crucial for fisheries managers to understand the social attitudes, beliefs and values associated with the fishery. Furthermore, it is a professional responsibility of managers to help educate and share knowledge to influence those attitudes, beliefs and values.

Overall, the paradigm shift in fisheries management has been characterized as a movement from a focus on 'maximum sustained yield'(MSY) to 'optimum sustained yield' (OSY; Larkin 1977; Malvestuto and Hudgins 1998); the latter is defined as "a deliberate melding of biological, economic, social and political values designated to produce the maximum benefit to society from stocks that are sought for human use, taking into account the effect of harvesting on dependent or associated species" (Roedel 1975). In practice, OSY is highly complex and recognizes the need to incorporate a precautionary approach (Mace and Gabriel 1999) in the face of ecological uncertainty along with societal values (Sharp and Lach 2003). The managerial shift to OSY in

recreational fisheries is consistent with goals of sustainability and the emergence of ecosystem-based management as the dominant philosophy in resource management (Quinn 2002a). The 'active management' that accompanies OSY (especially when considering special regulations) requires adequate resources and careful attention to the establishment of: clear goals, measurable objectives, mechanisms for meaningful public involvement, implementation strategies, monitoring, communication of results and adaptive management (Barber and Taylor 1990; Wright 1992; American Fisheries Society 1995; Krueger and Decker 1999; Fisher and Burroughs 2003; Pereira and Hansen 2003; Sullivan 2003). Lester et al. (2003) advocate the implementation of watershed-scale experiments to fully test the effectiveness of regulations and management approaches.

In a recent national assessment of planning for coldwater fisheries management in the United States, Born and Stairs (2002) identified the elements of successful management plans:

- correctly diagnosing and identifying critical issues and problems, including being proactive and appropriate in terms of scale and scope;
- setting clear short- and long-range goals (in counsel with affected interests) for the fisheries resource and ecosystem;
- acquiring and synthesizing all relevant information for inventories, analyses, and assessments;
- capitalizing on all planning process opportunities to communicate and interact with, and educate and learn from, user groups and other target audiences;
- engaging the public and interest groups in collaborative processes, including establishment of partnerships that carry over into plan implementation activities;
- maximizing the potential for plans to influence decision-making, including setting budgetary priorities and funding management projects;
- establishing evaluation processes and metrics to measure performance and to guide adaptive management; and
- providing a management and coordination framework for agency staff and units (p. 42).

The authors found that the weakest area of the planning process across all jurisdictions was the adequacy of engaging anglers and other interested constituencies in the process.

1.5 Recreational Fisheries Management in Alberta

The mandated approach to fisheries management in Alberta reflects the movement towards OSY and active management. The mission for fisheries management, as stated in *A Fish Conservation Strategy for Alberta 2000-2005* (Alberta Fisheries and Wildlife Management Division 1998), is: "to sustain the abundance, distribution and diversity of fish populations at the carrying capacity of their habitats. Biodiverse and productive ecosystems maintain healthy fish populations and support social and economic benefits for Albertans" (p. 3). The three primary components involved in achieving the mission are as follows:

- Habitat Maintenance - sustain, or achieve a net gain in, the quality and quantity of fish habitat;
- Fish Conservation - regulate fish harvest in line with, and not exceeding, the productive capacity of fish populations; and
- Fish-Use Allocation - manage fish populations in a manner that meets the present expectations of Albertans without compromising the ability of future generations to meet their expectations (p. 3).

The federal *Fisheries Act* guides most of the fisheries regulations in Alberta; however, the proclamation of the *Fisheries* (Alberta) *Act* and associated regulations in 1997 marked a jurisdictional transfer of federal authority to the province for fisheries management. One result of the new provincial *Fisheries Act* is a more expedient process for enacting licensing and regulation changes.

In 1997, Alberta Fish and Wildlife initiated a review of sport fishing regulations for the Eastern Slopes region. The review was instigated by increasing angling pressure (which more than doubled in the 1990s) and declining fish populations in the relatively low productivity headwaters of southwestern Alberta. The review was conducted by a multi-stakeholder steering committee and included: examination of scientific literature, a random telephone survey (n=250), a series of public workshops (144 participants), and a questionnaire (55 returned). The steering committee returned a suite of recommendations for "a more aggressive conservation ethic" to the Minister of Environment in July 1997 (Alberta Fish and Wildlife Division 1999). The Minister announced significant regulation changes on 11 February 1998 and the changes became effective 1 April 1998. The changes included:

- standardized seasons for each of the 4 Eastern Slopes watershed units (to protect fish and make the regulations easier to comply with);
- reduced bag limits [2 for trout and char species and Arctic grayling (province-wide limit was 5) and 5 for mountain whitefish];
- increased minimum size limits for most salmonids;
- increase in number of designated zero-limit (catch-and-release) waters;
- bait restrictions to reduce hooking mortality.

The new Eastern Slopes regulations were designed to offer additional protection to native species and provide a sustained, high quality angling experience. However, as with any regulations, there are some potential problems with the details of the changes. In particular, there have been both ecological and social concerns raised about the regulations with respect to their treatment of brook trout and the implications on native species (especially bull trout and cutthroat trout).

The overall management concern with brook trout populations in Eastern Slopes streams is summarized by Stelfox et al. (2001a):

> Brook trout *Salvelinus fontinalis* are not native to Alberta, but are present in many waters along the Eastern Slopes as a result of extensive stocking efforts in the mid 1900s. In many waters in the southern portion of the Eastern Slopes of Alberta, brook trout populations have increased while native bull trout *Salvelinus confluentus* and westslope cutthroat trout *Oncorhynchus clarkii lewisi* have decreased or disappeared. Brook trout spawn at a younger age and smaller size than both bull trout and cutthroat trout, are less readily caught, generally do not live as long or grow as large, and are more prone to overpopulation and stunting. The net result is that high quality, high-catch-rate fisheries for native bull trout and cutthroat trout are often replaced with lower quality fisheries for smaller, less-catchable, non-native brook trout (p. 37).

Liknes and Graham (1988) suggest that special regulations designed to conserve westslope cutthroat trout and encourage the harvest on non-native species "may benefit populations in some waters" (p.58). One challenge associated with employing angler harvest as a management tool for non-native fish suppression is overcoming the catch-and-release canon that <u>all</u> trout must be released. The question is how to develop and implement fishing regulations that can potentially

improve, rather than exacerbate, the change in species composition and declining fishery quality as defined above.

The new Eastern Slopes regulations are characterized by special conditions whereby all or some fish must be released. For example, in a portion of the Bow River, anglers may keep two trout with the following conditions: cutthroat or rainbow trout must be over 35 cm, no size limit for brook trout, and zero bag limit for bull trout. In several other streams, only brook trout may be harvested. Inherent in such special regulations are the assumptions that anglers can understand the regulations, will comply with the regulations, and can identify the species to which the regulations apply (Brewin 1997; Schill and Lamansky 1999). The final assumption (species identification) has proven to be problematic in a number of recent studies of western North American trout waters (Schill and Lamansky 1999; Schmetterling and Long 1999; Stelfox et al. 2001b; Quinn 2002b).

The potential problems with the Eastern Slopes regulations, as they pertain to brook trout, can be summarized as follows:

1. Inability of anglers to correctly identify fish species may result in the harvest of other trout species in situations where zero-catch is applied to a species (e.g., bull trout) or all species except brook trout.

2. Inability of anglers to correctly identify fish species may result in the harvest of under-size cutthroat trout and rainbow trout on streams where length limits vary by species (e.g., where regulations allow for smaller-sized brook trout to be harvested).

3. Conservative bag limits preclude the use of angling harvest as a potential method to suppress brook trout.

4. Conservative bag limits intended to protect native species may be limiting the potential of anglers to harvest brook trout when doing so would not be detrimental to the native fish and could increase recreational opportunities and angler satisfaction.

All of these potential problems could be lessened if managers had greater confidence in the ability of anglers to correctly identify fish species.[2]

Fish identification education programs have been developed by several jurisdictions in western North America (e.g., Alberta, Idaho, Montana, Oregon, Wyoming and others). Materials developed to educate anglers on the distinguishing characteristics of bull trout have been particularly well developed (e.g., 'No Black Put it Back' campaign). The development of these materials was partly driven by the need to support the special regulations afforded to bull trout. Reviews of the efficacy of such materials and programs have demonstrated that they are successful in educating anglers on species identification (Schill and Lamansky 1999; Schill et al., 2001; Stelfox et al. 2001b; Hall 2003). However, all of the existing education programs are voluntary. The result is that many anglers are not necessarily exposed to the materials. It follows that special regulations are likely failing to achieve their full potential.

In 1998, Alberta Fish and Wildlife Division (with the collaboration of Trout Unlimited Canada) initiated a project to test the effectiveness of anglers to suppress an introduced population of brook trout in Quirk Creek, a tributary of the Elbow River in Alberta's Eastern Slopes (Stelfox et al. 2001a; Paul et al. 2003; Stelfox et al. 2004). Volunteer anglers, who first had to past a fish identification test, were required to keep all brook trout, but had to release all native fish (cutthroat and bull trout). Between 1998 and 2003, anglers harvested nearly 8000 brook trout from Quirk Creek. In the first two years of the project, harvest rates of over 650 brook trout/ha (55 kg/ha) had little effect on catch rates, mean fork length or population density of brook trout. However, population estimates show that brook trout have declined since 2000 and cutthroat trout increased in 2003. More time and further analyses are required to determine the long-term effectiveness of this project. To date, the following conclusions can be drawn from the Quirk Creek Brook Trout Suppression Project: 1) misidentification of salmonids is a problem among anglers, 2) the problem of misidentification can be rectified with a good education program, and 3) brook trout in Quirk Creek are highly resilient to over-exploitation.

[2] An additional issue that requires further study is the potential for selective angling to be ineffective due to hooking mortality of native species. Bull trout and cutthroat trout are estimated to be 1.5-2.5 times more likely to be caught than brook trout. The resultant higher catch rates could lead to inadvertent hooking mortality that could negate the benefits of removing brook trout (Paul et al. 2003).

2. METHODS

Copies of fishing regulations were obtained for all provinces and states in North America. The review focused on regulations for salmonids in freshwater. A systematic review of National Park fishing licenses and regulations was beyond the scope of the report. However, a selection of National Parks from western North America was included for comparison with other regional salmonid management strategies (i.e., Banff, Jasper, Yoho, Kootenay, Glacier, Mount Revelstoke and Waterton Lakes National Parks in Canada and Glacier, North Cascades, Grand Tetons and Yellowstone National Parks in the United States). The costs for freshwater fishing licenses were summarized for North America. Key informants (fisheries managers) were also contacted to determine if there were additional plans or programs for special management or education that might not be apparent in the regulations. The selection of key informants concentrated on western North American trout fisheries. In total, 39 key informants were contacted (Appendix A). Web-based searches were conducted for angling regulations from Australia, New Zealand, South America, Africa and Europe. Web sites and downloadable documents were reviewed for any special regulations requiring mandatory education or special licenses for reduced or increased harvest. Highlights of these searches are presented in Appendix B. For comparison, a review of education requirements for hunting licenses was also conducted (Appendix D).

The final method was a short survey of anglers on Highway 940 (Forestry Trunk Road) along the Livingstone River in SW Alberta. Three questions directly pertaining to the current study were added to a more comprehensive survey of recreation participants conducted in the area during the summers of 2003 and 2004 (see St Arnaud 2004 for full details). If respondents to the larger survey indicated that the primary purpose of their trip was fishing, they were asked the following three questions:

a) Which of the following best describes your personal feelings about catch-and-release fishing in this area?

   i) should be catch-and-release
   ii) should be some catch-and-keep
   iii) keep only introduced species (eg., brook trout)

b) If you could obtain a license to keep selected fish species, would you be willing to take a fish identification test to do so? yes/no

c) Would you be willing to pay more for such a license? yes/no.

3. RESULTS

3.1 North America

There is a great deal of similarity in the licensing systems for recreational anglers in North America. Every state, provincial and territorial jurisdiction requires adult anglers to purchase a fishing license for freshwater salmonids. One Canadian exception is Newfoundland where residents are not required to purchase a license to fish for trout on non-scheduled salmon waters. In addition, no license is required to fish in Glacier National Park. In the United States, every state charges a greater fee for non-resident (out-of-state) anglers. In Canada, there are greater fees for non-residents as well. The difference between Canada and the United States in this regard is that most Canadian provinces and territories charge international non-residents (i.e., non-Canadians) more than Canadian non-residents. Alberta, Manitoba and Ontario are the only exceptions as they charge Canadian all non-residents the same license fee as provincial residents.

There is considerable variation in the cost of fishing licenses across North America (Table 3.1 and Figures 3.1 and 3.2). In Canada, a standard (i.e., not a special demographic permit) annual license for a resident costs $0.00[3] to $36.00 with a mean of $16.27 (Canadian Dollars). A basic license in the United States costs between $5.00 and $35.00 with a mean value of $16.42 (U.S. Dollars). Non-resident anglers are generally charged two to three times the resident amount. In Canada, a standard license includes trout/char. Twenty-five states in the U.S. require anglers to purchase a trout stamp (or equivalent) to fish for freshwater salmonids. In ten of these states, the charge to non-residents for a trout stamp is greater than for residents. The cost of a trout stamp ranges from $4.20 to $13.00 for residents and $5.50 to $49.50 for non-residents. The additional cost of a trout stamp increases the overall license fee by 50 to 100%. The mean value for a U.S. angling license with trout included is $20.54 for residents and $47.10 for non-residents. Tables

[3] The zero value reflects the lack of a requirement for resident anglers in Newfoundland to possess a license for fishing trout on inland waters. Resident anglers fishing for trout on scheduled salmon rivers are required to possess a salmon license ($20).

3.2 and 3.3 provide a more comprehensive summary of freshwater angling licenses in North America.

When the U.S. angling license fees are adjusted for direct comparison to the Canadian dollar (exchange rate of 1.25), then the overall average price of an angling license for trout in North America is $Cdn 23.74 (SD = 9.40) for a resident annual permit and $Cdn 56.12 (SD = 20.98) for a non-resident (international) permit. For comparison, the Alberta annual resident permit is $21.00 and the international non-resident license is $60.00.

License requirements and costs vary significantly among western national parks. Glacier National Park (Montana) does not require any fishing license while Grand Tetons National Park requires anglers to possess a Wyoming State License as well as a $10 conservation stamp and a Grand Tetons license ($18/year resident, $75/year non-resident, $3/day resident, $10/day non-resident). Yellowstone National Park does not require a state license, but does require a Yellowstone National Park license ($35/year, $15/3 days). Finally, North Cascades National Park does not require a park license, but does require a Washington State license. The Canadian western mountain parks share a single set of regulations and one license ($13/year, $6/week in 2003).

Table 3.1 Summary of standard freshwater angling license fees for Canada and the United States (2003).

Jurisdiction	Mean ($)	Std Dev ($)	Max ($)	Min ($)
Canada (Includes Trout) $Cdn				
Resident	16.27	8.74	36.00	0.00
Non-resident Cdn	30.22	16.29	57.50	8.00
Non-resident Int'l	45.53	16.66	80.00	18.70
United States (No Trout) $US				
Resident	16.42	6.00	35.00	5.00
Non-resident	40.85	16.68	100.00	15.00
Unites States (Includes Trout) $US				
Resident	20.54	6.91	35.00	5.00
Non-resident	47.10	17.01	101.00	21.20

Nb – All values are presented in the currency of the country to which they apply (i.e., Canadian Dollars and American Dollars with no adjustment for exchange rates).

Fig. 3.1 **Frequency distribution of standard freshwater angling license fees in 2003 for Canada.**

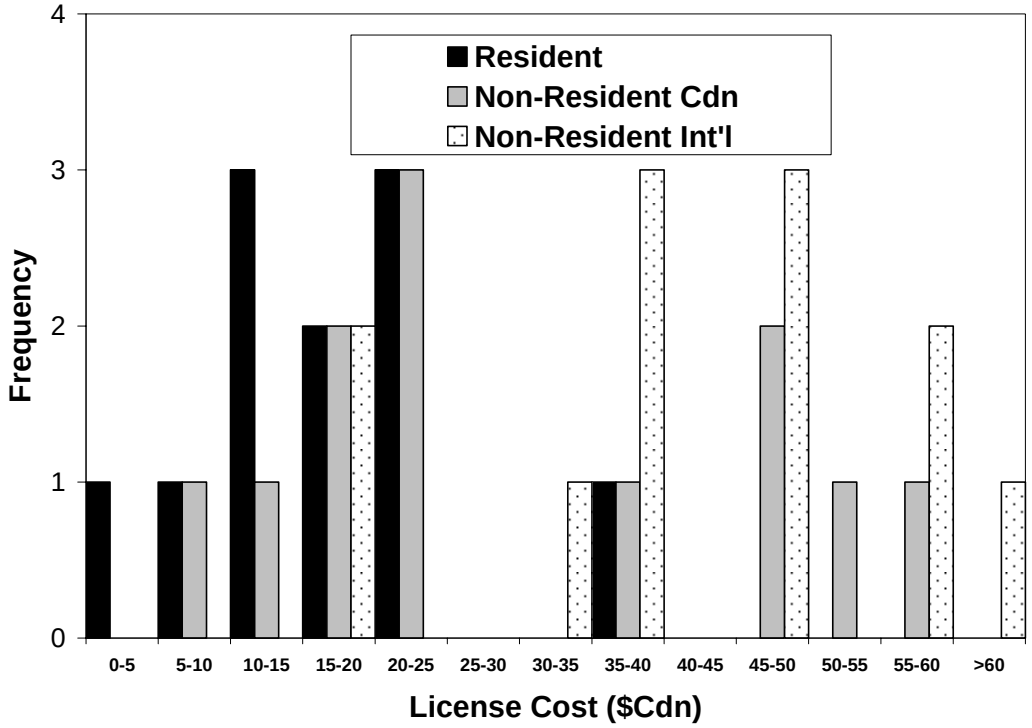

Fig. 3.2 **Frequency distribution of freshwater angling license fees in 2003 with and without trout stamp/permit, for the United States.**

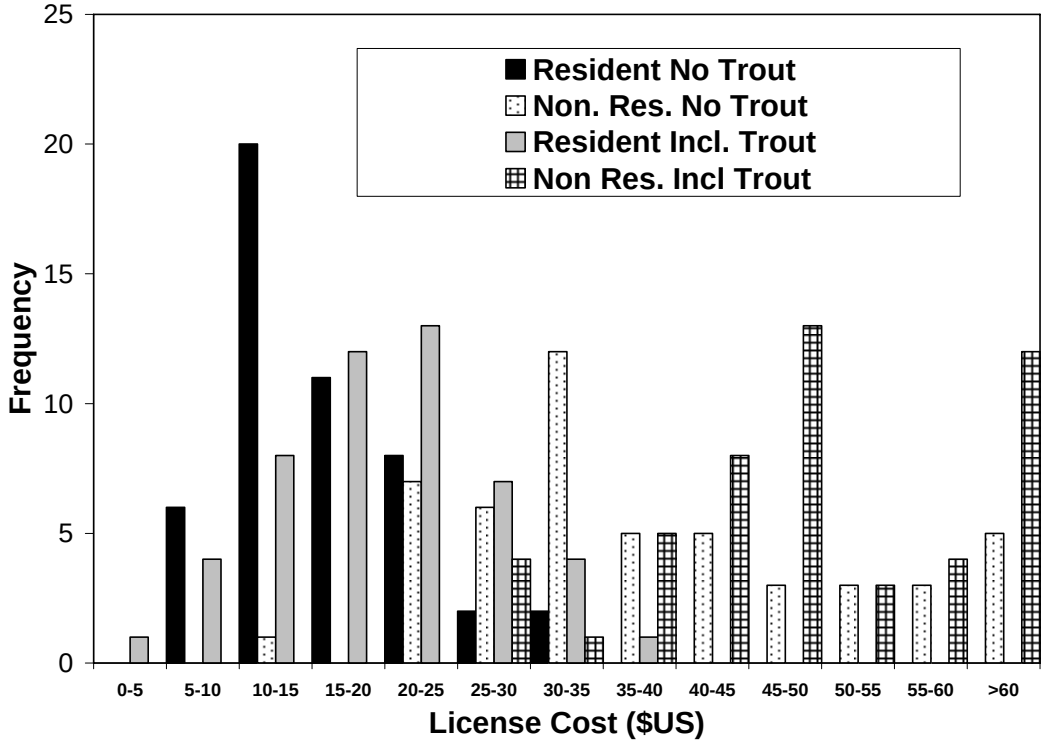

Table 3.2 Summary of freshwater angling licenses and special regulations in 2003 for Canada (Part A – provinces with no Atlantic salmon license).

Jurisdiction and Residence	Additional Fees		Annual License $CDN					Limited License (Days) $CDN					Special Regualtions		
	Special Atlantic Salmon License	Identification Card (annual cost)	Basic Annual	Seniors Annual	Conservation Annual	Catch-and-Release Only	Couple or Family	1	3	5	7	8	Mandatory Barbless Hooks	Designated Catch & Release Waters	Flyfishing Only Waters
British Columbia													D*	Y	Y
Resident			36.00	5.00				10.00				20.00			
Non-Res. Cdn			55.00	55.00				20.00				36.00			
Non-Res. Intn'l			80.00	80.00				20.00				36.00			
Alberta													N**	Y	N
Resident		2.00	21.00	0.00											
Non-Res. Cdn		2.00	21.00	0.00											
Non-Res. Intn'l		2.00	60.00	60.00				22.00		40.00					
Saskatchewan													D	Y	N
Resident			25.00	10.70					12.00						
Non-Res. Cdn			40.00	40.00					20.00						
Non-Res. Intn'l			50.00						25.00						
Manitoba													Y	N	N
Resident			15.00	6.00	6.00										
Non-Res. Cdn			15.00	15.00	9.00										
Non-Res. Intn'l			40.00	40.00	22.00										
Ontario													D	Y	Y
Resident		2.00	21.50	0.00	12.75			10.00							
Non-Res. Cdn		2.00	21.50	0.00	12.75			10.00							
Non-Res. Intn'l			59.50	59.50	36.00			15.50			38.00				
Northwest Territories													N	N	N
Resident			10.00												
Non-Res. Cdn			20.00						15.00						
Non-Res. Intn'l			40.00						30.00						
Nunavut													N	N	N
Resident			10.00												
Non-Res. Cdn			20.00						15.00						
Non-Res. Intn'l			40.00						30.00						
Yukon													D	Y	N
Resident			15.00	0.00											
Non-Res. Cdn			25.00	25.00											
Non-Res. Intn'l			35.00	35.00											

Table 3.2 Continued (Part B – provinces with Atlantic salmon license)

Jurisdiction and Residence	Additional Fees		Annual License $CDN					Limited License (Days) $CDN					Special Regualtions		
	Special Atlantic Salmon License	Identification Card (annual cost)	Basic Annual	Seniors Annual	Conservation Annual	Catch-and-Release Only	Couple of Family	1	3	5	7	8	Mandatory Barbless Hooks	Designated Catch & Release Waters	Flyfishing Only Waters
Quebec													N	N	Y
Resident	No Atlantic Salmon		14.13	11.30					8.04						
Non-Res. Cdn	No Atlantic Salmon		45.21	45.21				8.91	19.78		30.43				
Non-Res. Intn'l	No Atlantic Salmon		45.21	45.21				8.91	19.78		30.43				
Resident	Atlantic Salmon		31.73			8.91									
Non-Res. Cdn	Atlantic Salmon		97.37			8.91									
Non-Res. Intn'l	Atlantic Salmon		97.37			8.91									
New Brunswick													N	Y	Y
Resident	No Atlantic Salmon		17.25	0.00											
Non-Res. Cdn	No Atlantic Salmon		57.50	57.50					23.00		34.50				
Non-Res. Intn'l	No Atlantic Salmon		57.50	57.50					23.00		34.50				
Resident	Atlantic Salmon		24.15	14.95											
Non-Res. Cdn	Atlantic Salmon		149.50	149.50					40.25		80.50				
Non-Res. Intn'l	Atlantic Salmon		149.50	149.50					40.25		80.50				
Newfoundland													D	Y	Y
Resident	No Atlantic Salmon		0.00												
Non-Res. Cdn	No Atlantic Salmon		8.00				13.00								
Non-Res. Intn'l	No Atlantic Salmon		8.00				13.00								
Resident	Atlantic Salmon		20.00				30.00								
Non-Res. Cdn	Atlantic Salmon		53.00				78.00								
Non-Res. Intn'l	Atlantic Salmon		53.00				78.00								
Nova Scotia													N	Y	Y
Resident	No Atlantic Salmon		17.25	5.75											
Non-Res. Cdn	No Atlantic Salmon		46.00					5.75			23.00				
Non-Res. Intn'l	No Atlantic Salmon		46.00					5.75			23.00				
Resident	Atlantic Salmon		28.75												
Non-Res. Cdn	Atlantic Salmon		120.75								46.00				
Non-Res. Intn'l	Atlantic Salmon		120.75								46.00				
Prince Edward Island													D	N	Y
Resident	No Atlantic Salmon		9.35	0.00				.							
Non-Res. Cdn	No Atlantic Salmon		18.70	18.70				6.51							
Non-Res. Intn'l	No Atlantic Salmon		18.70	18.70				6.51							
Resident	Atlantic Salmon		9.35	9.35											
Non-Res. Cdn	Atlantic Salmon		9.35	9.35											
Non-Res. Intn'l	Atlantic Salmon		9.35	9.35											

Addtitional Notes

*** D - only in designated waters**

British Columbia has additional fees for classified waters ($15/year for residents, $20-$40/yr for non-residents) as well as conservation surcharges for steelhead, salmon and other identified populations

**Alberta instituted mandatory barbless hooks in 2004/05, Northwest Territories indicated an intent to institute barbless hooks

Several provinces and territories recommend, but do not require barbless hooks for all catch-and-release fishing

Barbless hooks are required on all designated catch-and-release waters in Saskatchewan and the Yukon

In addition to the license fees, all anglers in Prince Edward Island are required to contribute $12.15 annually to the Wildlife Conservation Fund

The Quebec "catch-and-release" license is only valid when the holder uses the services of an outfitter

Table 3.3 Summary of freshwater angling licenses and special regulations in 2003 for the United States.

Jurisdiction and Residence		Annual License $US						Limited License (Days) $US									Special Regs		
	Annual Conservation Stamp or Equiv.	Basic annual	Trout Stamp/Permit	Lifetime	Seniors	Seniors Lifetime	Couple or Family	1	2	3	4	5	7	8	10	14	30	Mandatory Barbless Hooks	Designated Catch & Release Waters	Flyfishing Only Waters
AL																		N	N	N
Res.		10.50	5.00	150.00		10.50				6.50										
Non.Res.		32.00	12.00							11.00			17.00	22.00						
AK																		N	N	Y
Res.		15.00			0.00															
Non.Res.		100.00						10.00		20.00			30.00			50.00				
AZ																		D*	N	N
Res.		18.00	10.50	variable	0.00		55.30	12.50												
Non.Res.		51.50	49.50					12.50				26.00								
AR																		D	Y	N
Res.		10.50	5.00	1,000.00		10.50				6.50										
Non.Res.		32.00	12.00							11.00			17.00			22.00				
CA																		D	Y	N
Res.		30.70		variable					11.05											
Non.Res.		82.45							11.05						30.70					
CO																		N	Y	N
Res.		20.25			10.25			5.25				18.25								
Non.Res.		40.25						5.25				18.25								
CT																		D	Y	N
Res.		20.00			0.00															
Non.Res.		40.00								16.00										
DE																		N	N	Y
Res.		8.50	4.20																	
Non.Res.		15.00	6.20										5.20							
FL																		N	N	N
Res.		13.50		variable																
Non.Res.		31.50											16.50							
GA																		D	Y	N
Res.		9.00	5.00	variable				3.50												
Non.Res.		24.00	13.00					3.50					7.00							
HI																		N	N	N
Res.		5.00			0.00															
Non.Res.		25.00											10.00				20.00			
ID																				
Res.		23.50		variable														D	Y	Y
Non.Res.		74.50						10.50	14.50	18.50		26.50	34.50							
IL																		N	N	N
Res.		13.00	6.50		6.75			5.50												
Non.Res.		24.50	6.50					5.50							13.00					
IN																		N	N	N
Res.		14.25	9.25	427.50				7.00												
Non.Res.		24.75	9.25					7.00					12.75							
IA																		N	Y	N
Res.	3.50	11.00	11.00			51.00							9.00							
Non.Res.	3.50	36.50	13.50										27.50							
KS																		N	N	N
Res.		19.00	11.00	301.00				6.00												
Non.Res.		41.00	11.00					6.00					21.00							

Table 3.3 Continued

Jurisdiction and Residence		Annual License $US									Limited License (Days) $US							Special Regs		
	Annual Conservation Stamp or Equiv.	Basic annual	Trout Stamp/Permit	Lifetime	Seniors	Seniors Lifetime	Couple or Family	1	2	3	4	5	7	8	10	14	30	Mandatory Barbless Hooks	Designated Catch & Release Waters	Flyfishing Only Waters
KY																		N	Y	N
Res.		15.00	10.00		5.00		27.00	6.00	12.00											
Non.Res.		35.00	10.00					7.00	14.00	21.00						25.00				
LA																		N	N	N
Res.		9.50		300.00	5.00															
Non.Res.		60.00		3,000.00				5.00			15.00									
ME																		N	Y	Y
Res.		19.00		variable	0.00			9.00		21.00										
Non.Res.		50.00						9.00		21.00			34.00			38.00				
MD																				
Res.		10.50	5.00		5.00							7.50						N	Y	Y
Non.Res.		20.50	5.00							5.00		7.50								
MA																		N	Y	Y
Res.	5.00	27.50			16.25					12.50										
Non.Res.	5.00	37.50								23.50										
MS																		N	Y	Y
Res.	1.00	14.00	13.00		10.80			7.00												
Non.Res.	1.00	30.00	11.00					7.00												
MN																		D	Y	N
Res.		17.00	8.50	variable			25.00	8.50												
Non.Res.		34.00	8.50				46.00	8.50		20.00			24.00							
MI																		N	N	N
Res.		9.85		1,000.00	5.00					4.85										
Non.Res.		33.85						9.85		17.85										
MO																		N	Y	N
Res.	2.00	12.00	7.00	variable				5.50												
Non.Res.	2.00	35.00	7.00																	
MT																		N	Y	N
Res.	4.00	13.00							5.00											
Non.Res.	7.00	60.00							15.00											
NB																		N	N	N
Res.	5.00	15.00		300.00						10.00										
Non.Res.	5.00	45.00								14.00										
NV																				
Res.		21.00	10.00		5.00			7.00	9.00	11.00	13.00	15.00	19.00					D	Y	N
Non.Res.		51.00	10.00					12.00	16.00	20.00	24.00	28.00	36.00							
NH																		D	Y	Y
Res.		35.00																		
Non.Res.		53.00						15.00		28.00			35.00							
NJ																		N	Y	N
Res.		22.50	10.50		12.50															
Non.Res.		34.00	20.00						9.00				19.50							
NM																		Y	Y	N
Res.	5.00	17.50			5.00			8.00				16.00								
Non.Res.	5.00	39.00						8.00				16.00								
NY																		N	Y	Y
Res.		19.00						15.00					12.00							
Non.Res.		40.00						15.00					25.00							
NC																		D	Y	Y
Res.		15.00	10.00	250.00				5.00												
Non.Res.		30.00	10.00					10.00				15.00								

Table 3.3 Continued

Jurisdiction and Residence		Annual License $US									Limited License (Days) $US							Special Regs		
	Annual Conservation Stamp or Equiv.	Basic annual	Trout Stamp/Permit	Lifetime	Seniors	Seniors Lifetime	Couple or Family	1	2	3	4	5	7	8	10	14	30	Mandatory Barbless Hooks	Designated Catch & Release Waters	Flyfishing Only Waters
ND																		N	N	N
Res.	1.00	10.00			3.00		14.00													
Non.Res.	2.00	25.00					35.00			10.00			15.00							
OH																		N	N	N
Res.		15.00			0.00			7.00												
Non.Res.		24.00								15.00										
OK																		N	N	N
Res.		12.50	7.75	150.00		6.00														
Non.Res.		28.50	7.75	250.00								10.00				20.00				
OR																		D	Y	Y
Res.		19.75			9.50			8.00	14.50	21.00	27.50									
Non.Res.		48.50						8.00	14.50	21.00	27.50		34.75							
PA																		D	Y	Y
Res.		17.00	5.50		4.00	16.00														
Non.Res.		35.00	5.50							15.00			30.00							
RI																		N	Y	Y
Res.		18.00	5.50																	
Non.Res.		35.00	5.50							16.00										
SC																		N	Y	N
Res.		10.00		300.00												5.00				
Non.Res.		35.00											11.00							
SD																		N	N	N
Res.		21.00			5.00			7.00												
Non.Res.		59.00					59.00	12.00		30.00										
TN																				
Res.		21.00	12.00	variable	.	11.00		2.50										N	Y	N
Non.Res.		26.00	25.00							20.50					30.50					
TX																		N	N	N
Res.		23.00	7.00	600.00	6.00					12.00						15.00				
Non.Res.		50.00	7.00									30.00								
UT																		N	Y	N
Res.		26.00			21.00			8.00					16.00							
Non.Res.		70.00						12.00					32.00							
VT																		N	Y	N
Res.		20.00								10.00										
Non.Res.		41.00							15.00	20.00			30.00							
VA																		N	Y	Y
Res.		12.00	12.00	250.00	1.00	10.00						5.00								
Non.Res.		30.00	30.00	500.00								6.00								
WA																		D	Y	Y
Res.		21.90			5.48				6.57											
Non.Res.		43.80							6.57											
WV																		N	Y	Y
Res.	3.00	11.00	7.50	325.00																
Non.Res.	10.00	30.00	10.00																	
WI																		D	Y	N
Res.		14.00	7.25		7.00		24.00	10.00												
Non.Res.		34.00	7.25					10.00			15.00					20.00				
WY																		N	Y	N
Res.		15.00		250.00				3.00												
Non.Res.		65.00						10.00												

In addition to the base license fee, some jurisdictions charge a small additional fee for an identification card ($2/yr; Alberta and Ontario) or for a conservation stamp ($1-$10/yr; Iowa, Massachusetts, Michigan, Missouri, Montana, Nebraska, New Mexico, North Dakota, West Virginia) as a prerequisite to acquiring a fishing license. A conservation stamp (or equivalent) is an additional fee collected to generate revenue for conservation-related activities. Several key informants mentioned that there was a concern about declining angler participation and expressed a concern over the impact of raising license fees too much.

In 2003, British Columbia implemented changes to their freshwater, recreational angling licenses. The changes were precipitated by recommendations from the Recreation Stewardship Panel (2002) and a new *Freshwater Recreational Angling Strategy* (Joint Government-Sector Steering Committee 2002). The changes resulted in British Columbia having the highest freshwater fishing license costs in Canada. The costs of annual licenses for residents, non-resident Canadians and non-resident aliens are $36, $55 and $80, respectively. In addition, there are additional fees for 'classified waters' (42 highly productive trout streams) that are particularly costly for non-residents, as they are applied on a daily basis (Table 3.4). Finally, there are 'conservation surcharges' required to: fish for Steelhead, harvest salmon from non-tidal waters, and keep selected species from designated lakes (Table 3.5). So, for example, a non-resident alien wishing to fish for Steelhead on a Class I River (e.g., Sustut River or Gitnadoix River) for three days would require an 8-day license ($50), a Steelhead surcharge stamp ($60), and a Class I license (3 days x $40) for a total of $230 in license fees. A resident would pay $76 for the same scenario.

Table 3.4 Fees for angling in 'classified waters' in British Columbia in 2003 (in addition to angling license).

Licence Type / **Classified Waters Licences**	**Resident** (B.C. Residents)	**Non-Resident** (Residents of Another Province or Territory)	**Non-Resident Alien** (Residents of Another Country)
Classified Waters Licence	$15 (annual)	•	•
Class I Waters Licence	N/A	$40/day	$40/day
Class II Waters Licence	N/A	$20/day	$20/day

Table 3.5 Conservation surcharges payable for special angling situations in British Columbia in 2003 (in addition to angling license).

Licence Type / **Conservation Surcharges**	**Resident** (B.C. Residents)	**Non-Resident** (Residents of Another Province or Territory)	**Non-Resident Alien** (Residents of Another Country)
Steelhead	$25	$60	$60
Salmon	$15	$30	$30
Kootenay Lake Rainbow Trout	$10	$20	$20
Shuswap Lake Rainbow Trout	$10	$20	$20
Shuswap Lake Char	$10	$20	$20

Many jurisdictions offer a variety of other licensing options including lifetime licenses and differential fees for a variety of demographic groups (e.g., youth, seniors, veterans, couples, families, and disabled individuals). These options vary greatly and are not reviewed further for this report. In addition, all jurisdictions offer limited-term licenses for periods of 1-30 days (see Tables 3.2 and 3.3). A recent trend in the sale of fishing licenses is offering purchase via the internet (e.g., Hawaii, Illinois, Indiana, Kentucky, Missouri, New Hampshire, New Mexico, Oklahoma, South Carolina, South Dakota, Utah, and Washington).

Manitoba, Ontario and Quebec were the only jurisdictions that offered a 'conservation license'. In the first two cases, the license is offered at a reduced cost and entitles the holder to harvest a smaller number of some fish species than a standard license. In Manitoba the conservation license is $6 vs. $15 for a standard permit and includes reduced limits for walleye *Stizostedion vitreum*, sauger *Stizostedion canadense*, northern pike *Esox lucius*, lake trout *Salvelinus namaycush*, channel catfish *Ictalurus punctatus*, largemouth bass *Micropterus salmoides*, smallmouth bass *M. dolomieui* and stocked trout. In Ontario the conservation license is $12.75 vs. $21.50 and requires the release of all muskellunge *Esox masquinongy*, Atlantic salmon *Salmo salar*, sturgeon *Acipenser fulvescens* and Aurora trout *Salvelinus fontinalis timagamiensis* as well as reduced limits on most other species. Quebec was the only jurisdiction in North America to offer a mandatory catch-and-release license. The license is available to both residents and non-residents for $8.91 (vs. $14.13 and $45.21, respectively), and is only valid when the holder uses the services of a guide/outfitter.

In 2003, Manitoba was the only jurisdiction in North America to require barbless hooks for all recreational angling. Alberta and the Northwest Territories made barbless hooks mandatory in 2004. British Columbia, Saskatchewan, Ontario, Newfoundland, Prince Edward Island, the Yukon Territory and 14 states had special regulations requiring barbless hooks on designated waters. In summary, 20 of 63 (32%) North American states and provinces required the use of barbless hooks on at least some waters in 2003. In many jurisdictions where barbless hooks are not mandatory, their use is encouraged through special information in the regulations and/or on the agency Web site. The following text from the 2003 Maryland regulations is representative:

- Use of barbless hooks is recommended in special fishery management areas for those anglers that release some or all of the fish they catch. Although use of barbless hooks does not appear to significantly increase the chance of a released fish surviving, there are benefits. Barbless hooks are easier to remove, thereby reducing the amount of stress from handling when removing a hook. Injuries to fish, which cause scarring and loss of mouth parts, are also reduced. Barbless hooks also have the added advantage of being easier to remove from an angler's skin after an errant cast.
- Because barbless hooks may not be available at tackle retailers, you can easily make your own by breaking, filing or pinching down the barbs on regular hooks.
- Give barbless hooks a try. You may be surprised that you catch more fish.

Two other forms of special regulation reviewed for this study were: 1) designated catch-and-release waters and 2) flyfishing-only waters. In Canada, eight jurisdictions had designated catch-and-release only waters as did 33 U.S. states (65% of states and provinces). Flyfishing-only waters were identified in seven Canadian provinces and territories, and 16 U.S. states (36.5% of states and provinces). In addition, Jasper National Park was the only national park that had designated flyfishing-only waters.

No North American jurisdictions were found to require any form of angler education as a condition of obtaining an angling license. A number of jurisdictions reported having fishing and/or aquatic education programs, but these were all voluntary (see Appendix C). In contrast, all but two jurisdictions had mandatory hunter education and/or firearm safety courses (Appendix D). In most cases there were special conditions that 'grandfathered' experienced hunters, but will eventually require all hunters to take and pass a course before acquiring a hunting license. All but two of the jurisdictions included wildlife or other environmental content as part of their courses.

Special regulations are implemented in virtually all of the jurisdictions reviewed for this report. Epifanio and Lindloff (1999) define special regulations as follows:

> Special regulations are a management technique to encourage recovery of populations of coldwater species that are most vulnerable to angler exploitation. Most special regulations are designed to optimize the quality of the angling experience and require anglers to release all or most of the trout caught in the normal season or during extended season periods. At the heart of these regulations is that fishing mortality be reduced to levels where the recruitment (supply) of catch-quality fish can be maintained in face of heavy fishing pressure (demand) (p. 42).

Differential bag limits, size limits, delayed harvest openings, zero harvest on selected species and variation of regulations for individual streams were all common in the review conducted for this study.

Several of the western national parks have moved to restrictive regulations to protect native fish. For example, Yellowstone National Park instituted catch-and-release for all native fish in 2001. In addition, all lake trout caught in Yellowstone Lake, its tributaries and the Yellowstone River must be killed. The selective removal of lake trout, which threaten native cutthroat trout, is in

response to an illegal introduction that occurred in 1994 (Varley and Schullery 1995). The western Canadian mountain parks have no harvest of bull trout and low (or zero) bag limits for cutthroat trout.

Some special regulations of particular relevance to the current study include selective harvest of brook trout and a selected re-opening of bull trout harvest. Several jurisdictions in the western United States have instituted 'bonus' limits on brook trout in streams that have lower limits (or zero limits) for other species. These limits are substantially greater that the normal harvest limits and are considered a 'bonus' because they are often in addition to the regular trout bag limits. The usual intended purpose for these limits is to lessen the effect of brook trout on native species. For example, the bull trout and Dolly Varden *Salvelinus malma* management plan for Washington includes the following statement:

> Where brook trout and native char currently overlap, the management emphasis will be to reduce or eliminate hybridization between them. This will generally be *accomplished by using sport fishing regulations that allow higher harvest through increased daily limits,* or with active suppression of brook trout through mechanical, electrical, biological, or chemical means [emphasis added] (Washington Department of Fish and Wildlife 2000, p.9).

The U.S. *Bull Trout Draft Recovery Plan* (U.S. Fish and Wildlife Service 2002) recommends increased harvest of competing non-native species. For example, in the chapter that addresses the St. Mary-Belly River population (shared with Alberta), recommendation 3.4.2 is:

> Increase harvest of competing species. Adjust regulations in bull trout waters to encourage angler harvest of nonnative brook trout and other nonnative species. Examine potential to increase harvest of competing native species (lake trout, northern pike), in a manner that is compatible with bull trout persistence (Chapter 25, p. 101).

The following are examples of some brook trout 'bonuses':

- California – 10 brook trout bonus (under 10") to help with over-population;
- Colorado – 10 brook trout <8";
- Idaho – 10 brook trout bonus;

- Montana – 20 brook trout (Central and Western Districts);
- Oregon – no size or catch limit on brook trout in streams (some districts);
- Rocky Mountains National Park – 8 brook trout (6 if keeping 2 other trout);
- Utah – bonus of 4 brook trout on selected waters;
- Washington – 5 brook trout with no size limit and no limit in designated waters;
- Wyoming – 10 brook trout <8" bonus.

No jurisdictions with brook trout 'bonuses' have a requirement for special permits or mandatory angler education. All of the above jurisdictions have color fish identification guides in their fishing regulations as well as on their Web sites.

The hybridization of rainbow trout with cutthroat trout is an issue of considerable concern in some jurisdictions. For example, on the South Fork of the Snake River, Idaho Fish and Game has instituted a program to suppress rainbow trout and rainbow x cutthroat hybrids. There is no catch limit for rainbows and hybrids on a designated stretch of the river (see Appendix E). Anglers are encouraged to remove as many of the non-natives as possible. There is no special permit required nor is there any mandatory fish identification education.

Another recent (2004) change of note is that Montana re-instituted bull trout harvest in the Hungry Horse Reservoir, Lake Koocanusa, Swan Lake and the South Fork Flathead River. Harvest of bull trout requires a special license (currently free) and a catch card for mandatory reporting of angling success.

3.2 International Review

Germany and Austria were the only jurisdictions identified in this review to require mandatory angler education as a condition of obtaining an angling license (Fischereischein). In Germany, the requirement was first instituted in 1971. The course consists of at least 30 hours of instruction and can be taken full-time, evenings/weekends or on-line (Lukowicz 1998; Steffens and Winkel 2002). Topics include:

1. biological and special knowledge of fish (fish identification);
2. hydrology;
3. protection and care of the environment, including fish handling;
4. methods of fishing and bait/tackle;
5. legal/regulatory knowledge specific to fish and the environment.

Courses are offered by private (non-government) organizations with certified instructors. Subsequent to the course, anglers must pass a comprehensive, government-approved exam (Fischerprüfung). The details of the course and exam vary across the 16 federal states. In Bavaria, the exam consists of 60 multiple-choice questions and five long-answer questions. Participants must score > 75% on the multiple choice section and > 50% on the written section to pass the course. There is a 10-20% failure rate. The following are examples of multiple-choice questions participants may face in the exam:

- What are the key distinguishing features of the Arctic grayling?
- How do you differentiate between rainbow trout and brown trout?
- Which of these fish are non-native species?
- What is the difference between brown trout and lake trout?
- Which fish type is not wanted in trout waters?
- What is the minimum size limit and harvest season for rainbow trout?

Further information about the German course can be found at www.fischerpruefung.de (Nb - this is a German language page). The Web site includes sample exams at: http://www.fischerpruefung.de/Pruefungen/php/fs_xxxx.php3?Jahrgang=2004 (the year at the

end of the URL can be changed to view previous exams). Additional regulations in Germany include: 1) new anglers are issued a 'learners permit' and are required to fish with a seasoned angler for the first year, and 2) anglers wishing to fly fish must take a 1-day course and purchase a special fly fishing license.

In Austria, at least three of the nine states have made angler education mandatory since 2001. The trend is for the other states to adopt a similar requirement. A course and exam similar to Germany is offered by some states, while others offer a shorter 1-day seminar and exam. More information is available from: http://www.viaweb.at/oekf/infos.htm. Both Austria and Germany offer special permits to visitors that do not require a course and exam. No information was found regarding the effect of instituting mandatory education on license sales or participation in angling.

The regulation and management of recreational, freshwater angling in Europe differs from North America primarily with respect to land and water rights. There are differences between countries, but there are generally few angling waters in Europe under public ownership. The angling rights to the majority of waters rest with the landowner or with another private interest. The most common situation is a requirement for an annual, national or state angling license and then a permit (day, week, month) for each locally managed fishery (state or private). There are generally national or state guidelines on seasons and limits, but the details are a function of the fishery owner. Private ownership results in a huge variation in the cost (EURO 2-100/day) and conditions of local angling permits. Some examples are provided in Appendix B.

The use of special regulations in some parts of Europe has been limited by the values and beliefs of anglers and the public in general[4]. There are some that hold the view that catch-and-release fishing is "unethical and reprehensible" (Aas et al. 2002, p. 95). In particular, northern European countries are characterized by a strong harvest tradition akin to subsistence, even when angling takes place in a leisure context (Aas and Skurdal 1996). In Norway, for example, the Norwegian Council for Animal Ethics (1998) prepared a position paper for the government on catch-and-release regulations.[5] The following excerpt clearly communicates their position:

[4] Similar issues have been identified in the Canadian Arctic and in other northern indigenous communities where animist beliefs are at odds with catch-and-release (see for example, Lyman 2002).
[5] Such views are certainly not limited to Europe. There are philosophical, moral and ethical concerns raised by individuals (including anglers) and animal welfare organizations in North America as well (e.g., DeLeeuw 1996; Kerasote 1997; McIntyre 2000; Talbot 2001).

> The good deed, i.e., releasing the fish, is namely dependent on first inflicting suffering on the fish in the form of pain and fear. Just as it is not acceptable to trap birds or animals purely for the fun of it, the Council does not regard it as acceptable nature management to permit that fish be subjected to pain and stress by fishing them for no other reason than to satisfy people's need for recreation. If the fishing stock is too small to be harvested, the alternative in the view of the Council is to stop fishing…. Against this background, the Norwegian Council for Animal Ethics advises against the introduction of "catch and release" as a resource management measure in Norway.

Berg and Rösch (1998) suggest that animal welfare legislation in Germany effectively makes voluntary catch-and-release angling illegal. However, growing recognition of the economic value of recreational fishing, both domestically and for the international tourism market, has lead to a greater acceptance of catch-and-release angling and greater implementation of special regulations (Sipponen and Boval 2001). Furthermore, catch-and-release is one of the most useful tools available to fisheries managers to prevent over harvest of susceptible species or fisheries while still permitting angling.

Australia and New Zealand have very similar licensing and regulation systems to those found in North America. A sample of South American and African jurisdiction produced similar results. Jurisdictions within these countries have recently developed special regulations that include variable species bag limits, catch-and-release fisheries and flyfishing-only designations (Appendix B). Overall, there is a trend toward smaller bag limits and encouragement of mandatory, catch-and-release on at least some waters. There were no mandatory education programs nor was there any discussion of selective harvest to control introduced species. In fact, in Australia and New Zealand, the recreational trout fishery is entirely dependent on introduced species, since there are no native salmonids in these countries.

3.3 Survey of Anglers on Highway 940 along the Livingstone River

A roadside survey administered along the Forestry Trunk Road in southwestern Alberta sampled 187 individuals who indicated that the primary purpose of their trip was fishing. The Livingstone River has been managed as a catch-and-release fishery since the new Eastern Slopes regulations came into effect. The sample was opportunistic and is not statistically representative of Eastern

Slopes anglers. However, the sample size provides some insight into the attitudes of anglers toward catch-and-release and the selective harvest of brook trout (Table 3.6). The majority of respondents indicated a preference for mandatory catch-and-release (61.5%). Approximately 35% of anglers thought there should be some allowable harvest. However, only 3.7% thought that harvest should be restricted to introduced species (e.g., brook trout). The Livingstone River may not have been the best location to ask this question as there are no brook trout currently in this drainage. Most (72.6%) of the respondents indicated a willingness to take a mandatory fish identification test in order to harvest fish, but the majority would not pay more for such a license.

Table 3.6 Results of Livingstone River survey questions pertaining to catch-and-release angling.

Survey Questions and Responses	Frequency	Percent
Which of the following best describes your personal feelings about catch-and-release fishing in this area? (n=187)		
should be catch and release	115	61.5
should be some catch and keep	65	34.8
keep only introduced species (eg. brook trout)	7	3.7
If you could obtain a license to keep selected fish species, would you be willing to take a fish identification test to do so? (n=186)		
Yes	135	72.6
No	51	27.4
Would you be willing to pay more for such a license? (n=186)		
Yes	71	38.2
No	115	61.8

4. DISCUSSION AND RECOMMENDATIONS

Any changes to the current Eastern Slopes Stream Regulations should be considered as part of the overall fisheries planning and management process. It is essential that both good science and public values are incorporated into the decision-making process.

The current annual license fees in Alberta are slightly below the North American average. However, when compared to its immediate neighbours, Alberta has the lowest annual license fees. The largest discrepancy is in the non-resident Canadian license where Alberta charges less than half the rates of British Columbia and Saskatchewan. Similarly, the Montana out-of-state license is more than three times the cost of the out-of-province license in Alberta. Therefore, it is advisable that Alberta review its licensing cost structure.

Behnke (1989) suggests that the most important attribute for a fisheries management agency is credibility. Therefore, if changes are proposed to require anglers to pass a test before being permitted to harvest fish from designated streams, there may be some skepticism on the part of Alberta anglers arising from the recent regulation change requiring barbless hooks. Anglers who participated or followed the Review of Eastern Slopes Stream Fisheries Regulations have a valid basis for concern. The statement summarizing the regulation changes arising from the review included the following:

> There will be no regulation requiring the use of barbless hooks. Lack of conclusive evidence that barbless hooks reduce the hooking mortality of fish has resulted in the lifting of the barbless hook restriction that applied to selected stream systems. Anglers may choose to use barbless hooks if they feel these hooks help them to handle and release fish more quickly and carefully (Alberta Fish and Wildlife Division 2002)[6].

A recent commentary in an Alberta conservation publication commented:

[6] This information is still on the Web site as of January 2005.

> Each year the regulations guide gets fatter as more water bodies are assigned their own set of rules. As a result, the casual angler often has to do a lot of searching just to find the regulations for the water body he wishes to fish. Sometimes he gets confused and can't find the water body on the list, not realizing it falls under "province-wide regulations." Should we be confusing him further by requiring him to modify a lure to make it comply with an unnecessary regulation? (Meredith 2002).

Any new changes to the regulations will require some element of re-gaining the public trust.

However, the information reviewed for this report clearly indicates that the effectiveness of special regulations is currently hampered by the inability of some anglers to correctly identify salmonids. In order for the potential of special regulations to be fully realized, fisheries managers should consider alternative mechanisms and tools to improve the fish identification skills of anglers. Furthermore, the inability of some anglers to correctly identify stream salmonids limits the ability of fisheries managers to implement less conservative harvest limits for species that could sustain increased harvest rates or that should be reduced in numbers for the benefit of native species. Finally, the potential to involve anglers in the stewardship of native fisheries through the selective harvest of bio-invasive species is greatly reduced without more proficient fish identification skills.

The Quirk Creek Brook Trout Suppression Project demonstrated that there is potential to harvest more brook trout than would normally be permitted by the current 2-fish bag limit. The project also demonstrated that there is potential for anglers to misidentify their catch and harvest native species that would otherwise be afforded protection of special regulations. The issue that needs to be addressed is how to enable anglers to fully utilize the fisheries without adversely affective the native species.

4.1 Assessing the Effects of the Eastern Slopes Stream Angling Regulations of 1998

4.1.1 It is recommended that a comprehensive review be undertaken to evaluate the results of implementing the Eastern Slopes Stream Angling Regulations of 1998. The review should include both ecological (e.g., fish population and species composition) and human dimensions (e.g., experiential and attitudinal) parameters.

4.1.2 Past participants in the Quirk Creek Brook Trout Suppression Project should be surveyed (focus groups may be best) to gain an understanding of their experience. In particular, it would be very valuable to know more about their motivations for participation.

4.1.3 The results of the comprehensive review recommended above should be communicated to the Alberta public through, but not limited to, the following venues and media:

a) a 1-page summary published in the annual angling regulations;
b) a follow-up to the Web site information posted regarding the Eastern Slopes Review of Regulations – this material was last updated in 1999 and 2002;
c) integrated into public programming at the Bow Habitat Station;
d) press releases to the media;
e) a mail-out to angling clubs and related interest groups.

4.1.4 Any changes to the existing Eastern Slopes Stream Angling Regulations should be supported by the outcome of the comprehensive review as part of an adaptive management cycle.

4.2 Other Research

4.2.1 A literature review and interviews with key informants should be conducted to assess the effectiveness of brook trout bonus limits in other western jurisdictions. The review should determine what percentage of anglers are harvesting brook trout, how many brook trout are being harvested, the extent to which native fish are being harvested due to misidentification, whether brook trout populations are being suppressed, and what effects the suppression of brook trout is having on native and non-native fish populations. The review could also examine the use of selective regulations for the suppression of rainbow trout to reduce the effects of competition and introgression with westslope cutthroat trout (e.g., South Fork of the Snake River, Idaho).

4.2.2 The Alberta Government should encourage and support applied research in fisheries management, especially as it relates to special regulations and the control of exotic species. Collaboration with university researchers should be continued.

4.2.3 Information about Eastern Slopes angler attitudes towards native salmonid management should be collected through a random phone survey, workshops and a Web-based survey. The surveys should include an assessment of the demand for, and willingness of, anglers to harvest brook trout and other non-native species from Eastern Slopes streams.

4.2.4 Development of potential changes to angling regulations should include assessment by the public through quantitative surveys (conjoint analysis is recommended, see Aas et al. 2000).

4.3 Mandatory Fish/Angling Education for a Stewardship License

4.3.1 It is recommended that an incentive program be developed to encourage Alberta anglers to participate in education programs. For example, a 'stewardship license' could be made available to anglers passing an angler education test. There could also be a financial incentive phased into the program. At such time as the price of a resident angling license is increased, the price of a 'stewardship license' could be maintained at a lower rate. The goal would be to make the change revenue neutral. A key principle emerging from the consideration of 'green taxes' is that you should "tax what you don't want and don't tax what you do want" (Thompson 2002). The principle transfers well to this context and allows for the use of the market rather than regulations.

4.3.2 It is recommended that Alberta continue to implement and promote existing fish education programs and develop new materials and methods of delivery.

4.3.3 Fish identification courses could also be delivered by other organizations such as Trout Unlimited Canada, the Alberta Fish and Game Association and the Alberta

Conservation Association. Funds derived from the sale of fishing licenses should be made available for this purpose.

4.3.4 Courses should continue to be offered through the Alberta Fishing Education Program. (Note: The current Alberta Hunter Education Instructor's Association offers the Alberta Fishing Education Program, but the focus of the AHEIA is much stronger on hunting – see for example their items for sale and even the name of the organization. More emphasis on fishing education would be beneficial.)

4.3.5 The 'stewardship license' would be required to harvest any salmonids from identified waters in the Eastern Slopes. Anglers holding a standard fishing license would still be able to fish these waters, but would not be permitted to harvest fish.

4.3.6 Youth who do not have a 'stewardship license' but who wish to harvest salmonids from identified waters in the Eastern Slopes could be permitted to do so, provided that they are under the direct supervision of a person who possesses a 'stewardship license' and who assumes responsibility for identifying any harvest fish.

4.3.7 The delivery of course material (related to both general angling information and fish identification) could be delivered in-class and/or via the Web.

4.3.8 The administration of an angler education exam for the new 'stewardship license' could be implemented through accredited course instructors (e.g., AHEIA) and at Fish and Wildlife offices, which is how the first-time hunter exam is administered.

4.3.9 License retailers should not have to bear the burden of test administration, although it is recognized that vendors will have to be knowledgeable about the program.

4.3.10 Experience gained through the Quirk Creek Brook Trout Suppression Project should be used to design the actual test and to establish the criteria for passing the test.

4.3.11 The current Web-based fish identification quiz should be evaluated (focus groups recommended) and adopted for use after appropriate revisions are made.

4.3.12 To encourage participation in the first few years of implementing a 'stewardship license', participants could be eligible for draw prizes (sponsored by local stores, guides and outfitters). A stewardship angler newsletter would also be a good idea.

4.3.13 Anglers successfully completing the exam would have this information recorded as part of their Wildlife Identification Number (WIN) card, which would make them eligible to purchase a 'stewardship license'. This should not present a significant technological challenge and could be registered to the WIN card at the time of successful exam completion.

4.3.14 Anglers successfully completing the exam could also be issued a badge with their WIN number on it. This badge, which would be weatherproof and highly visible, would be worn when angling and would permit anglers who had purchased a 'stewardship license' to harvest fish from designated waters. This badge would no only identify the angler as someone who is proficient in salmonid identification, it would make it easier for officers and other anglers to readily see, from a distance, who was authorized to harvest trout as well as 'bonus brook trout' and would be a means of advertising the program and raising the profile of the 'stewardship license'.

4.3.15 Anglers wishing to maintain their status should be required to re-take the course every five years in cycle with their WIN card expiry.

4.4 Bonus Brook Trout Harvest

4.4.1 A ‘stewardship license’, as described above, precludes the necessity of having a separate ‘bonus brook trout harvest license’ and anglers holding the ‘stewardship license’ could be eligible to harvest bonus brook trout from designated streams.

4.4.2 The bonus brook trout harvest should be made available on a select number of Eastern Slopes streams as a **pilot program**. The program would be an expansion and logical extension of the current Quirk Creek Brook Trout Suppression Project.

4.4.3 A new slogan to promote the harvest of brook trout in selected waters could be: “**Red on Blue its for You”** in reference to the distinctive red dots within a blue halo that are characteristic of brook trout.

4.4.4 Ideally the selection of streams for brook trout harvest should be determined by: 1) known presence of brook trout in those streams, 2) the streams should be spatially contiguous (e.g., part of one sub-drainage) to facilitate both simplicity in understanding the regulation and enforcement, 3) the streams should still have populations of native bull trout and/or cutthroat trout present.

4.4.5 The same system might be applied to streams where hybridization of cutthroat and rainbow trout is a concern. The fish identification issues for these waters may be more difficult due to hybrids (i.e., cutbows).

4.4.6 The implementation of a pilot program should be accompanied by a commitment for education and enforcement on the affected streams.

4.4.7 Informational signage should be developed for the access points of the selected streams. The signage should include identification features of brook trout, bull trout and cutthroat trout. In some cases it would be beneficial to include brown trout and rainbow trout as well.

4.4.8 The pilot program should include clearly measurable objectives and a monitoring program to assess effectiveness. Effectiveness should include both ecological parameters (e.g., effect of suppression on native fish populations) and social parameters (e.g., angler satisfaction with fishery quality and harvest opportunities).

4.4.9 The pilot program should be implemented for a predetermined number of years (3-5 years recommended) and then evaluated for future continuation or expansion.

5. CONCLUSION

Management of recreational freshwater fisheries in North America has evolved towards a greater emphasis on the protection of native species. There is growing recognition that recreational fisheries face ecological collapse without significant changes in management (Post et al. 2002). The legacy of stocking programs, non-native species invasions and the cumulative effects of other land and water management regimes have created significant challenges for the future of native salmonids. The new Eastern Slopes angling regulations implemented by the Alberta Fish and Wildlife Division in 1998 are an attempt to address some of these challenges. The effectiveness of the new regulations, both ecologically and socially, should now be evaluated and communicated to the Alberta public. The results of the evaluation should be assessed with an eye to improving the management system. Recommended changes should be communicated to the public with a clear rationale and an opportunity for meaningful participation in the outcome of any final decision. Accepted changes should be implemented as part of an adaptive management cycle. Ongoing monitoring and research are essential to continuous improvement and active management of complex systems characterized by uncertainty.

It is well established that salmonid misidentification is a problem for many anglers. This problem diminishes the effectiveness of special regulations. Special regulations necessitate the correct identification of species, especially if anglers are permitted to harvest some species and/or within certain size limits. A number of fish identification programs, especially those that focus on a few key distinguishing features, have demonstrated that relatively simple education programs can be implemented to improve the proficiency of anglers to identify trout and char. Only two jurisdictions in the world currently require angler education as a precondition to obtaining a fishing license.

The option of a ‘stewardship license’ for Alberta is a positive mechanism to encourage better fish identification and improve the effectiveness of special regulations. Education materials and a mandatory angler education exam could be offered to Alberta anglers as a condition of obtaining the new ‘stewardship license’. The ‘stewardship license’ could eventually be offered at a reduced rate as an incentive for participation. Other incentives, such as an annual newsletter and promotional materials could also be part of the program. The ‘stewardship license’ could include

eligibility (and encouragement) for anglers to harvest a bonus number of brook trout from identified streams. The brook trout bonus streams should be carefully identified and monitored as part of a pilot program. To facilitate valid evaluation, implementation should include control areas where no brook trout bonus is allowed. However, the success of implementing a 'stewardship license' should not be solely based on the suppression of brook trout. Other measures of success should include such elements as: improved proficiency in fish identification, increased awareness of native species, reduced accidental harvest of native species due to misidentification, increased harvest opportunities, and increased angler satisfaction. The same mechanisms could be employed where the hybridization of westslope cutthroat trout and rainbow trout is a concern.

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APPENDIX A List of Fisheries Professionals Contacted for the Project

NAME	JOB TITLE	ORGAINIZATION
Chuck Brazil	Fisheries Technician	Alaska Department of Fish and Game
Johnathan Lyman	Aquatic Education Coordinator	Alaska Department of Fish and Game
Jim Stelfox	Fisheries Biologist	Alberta Fish and Wildlife
Doug Thornburg	Aquatic Education Program Manager	Arizona Game and Fish
Kirk Young	Fisheries Biologist	Arizona Game and Fish
Fishing in theCity		California Fish and Game
Jack Edwards	Chief - Conservation Education and Information	California Fish and Game
Dave Langlois		Colorado Department of Wildlife
Jim Alves		Colorado Department of Wildlife
Robin Knox	Colorado Sportfishing Program Manager	Colorado Division of Wildlife
Dr Kurt Fausch		Colorado State University
Cary Brunner		Ducks Umlimited
Rae Waddell	Fisheries Biologist	Florida Division of Freshwater Fisheries
Bill Horton	Anadromous Fish Coordinator	Idaho Fish and Game
Dan Schill	Principal Research Biologist	Idaho Fish and Game
Jim Fredericks	Regional Fisheries Manager	Idaho Fish and Game
Mark Liter		Idaho Fish and Game
Bob Robertson	Fisheries Biologist	Indiana Division of Fish and Wildlife
Jim Levitt	Fishing in the Neighborhood	Minnesota Department of Natural Resources
John Frayley	Conservation Information Officer	Montana Fish, Wildlife and Parks
Karen Zackheim	Fisheries Administrator	Montana Fish, Wildlife and Parks
Kent Gilge	Fisheries Biologist	Montana Fish, Wildlife and Parks
Steve Dalbey	Fisheries Biologist	Montana Fish, Wildlife and Parks
Tim Gallagher	Resource Program Manager	Montana Fish, Wildlife and Parks
Daryl Bauer	Researcer	Nebraska Fisheries Division
Mike Sloane	Division Chief	New Mexico Fisheries Management Division
David Jensen		North Dakota Fisheries Division
Janis Vetter	Fisheries Administrator	North Dakota Fisheries Division
Kurt Coplinski	Fisheries Biologist	North Dakota Fisheries Division
Bruce Roselund		Oregon Department of Fish and Wildlife
Nancy Smogor	Aquatic and Angler Education Coordinator	Oregon Department of Fish and Wildlife
Carol Thompson	Fisheries Biologist	Tennessee Fisheries Management Division
Darren Benjamin	Fisheries Biologist	USFWS
Ed Johnson	Regional Fisheries Biologist	USFWS, Colorado
Tom Pettengill	Sportfisheries Program Manger	Utah Division of Wildlife
Melissa Brunner	Aquatic Resources Educator	Wisconsin Department of Natural Resources
Ronald Benjamin	Fisheries Supervisor	Wisconsin Department of Natural Resources
Theresa Stabo	Aquatic Resources Educator	Wisconsin Department of Natural Resources
Wolfgang Wessel		German Embassy

APENDIX B Selected International Freshwater Licensing and Regulation Information

Nb – a good general Web site that introduces angling opportunities and regulations in Europe is: http://www.cybertrout.com/index.htm

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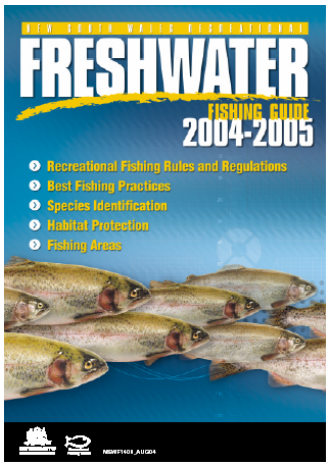
Argentina

- national and protected area regulations
- license required for Andean and Terra del Fuego areas, but not central and eastern side
- bag limits, size limits
- some designated catch and release
- largely an introduced species freshwater fishery

Australia



New South Wales – see:
http://www.fisheries.nsw.gov.au/rec/gen/anglers_kit.htm

- bag and size limits, 'notified' trout waters – includes some designated catch and release & 7 classes of waters for special regulations
- no additional non-resident license fees (day, week season licenses)
- volunteer 'Fish Care' education program for kids and families
- on-line licensing

Western Australia
See: http://www.fish.wa.gov.au/rec/broc/fresh/index.html

- bag and size limits
- some all-year openings
- bait restrictions, no designated flyfishing only
- on-line licensing

Northern Territory
See: http://www.fishingtheterritory.com/home/

- no recreational angling licenses required
- possession limits

Belgium

- licenses differ for navigable and non-navigable waters
- details vary by district
- net landing and release regulations

Chile

- freshwater and protected areas licenses
- additional costs for non-residents
- bag and size limits

Czech Rebublic

See: http://www.rybsvaz.cz/?page=ryb_rad&lang=en

- designated trout waters
- minimum size limits
- bag limits by total weight, not # of fish
- seasonal closures
- fly fishing only designations
- mandatory catch records
- mandatory landing net, hook removal device and measuring device

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Finland

See: http://www.fishinfinland.com/

- national fishing license required
- additional local permits required – many variations
- public access by "everyman's rights"
- some fly fishing only designations
- no designated catch and release
- bag limits

France

- few public waters (none for trout)
- require a national license and a local license
- some reciprocal agreements between regions
- picture required on license
- costs and details vary by fishing rights holder

Germany

See: http://home.t-online.de/home/joubin.far/english/fishing/fishing.htm

- no public fishing waters
- residents are required to complete a course and pass an exam to obtain a national license ~ $200 for course and books
- temporary licenses for visitors do not require the course & exam (Besucher-Fischereischein).
- federal state license (Fischereischein) and then local permit (Tageskarte) required
- tremendous variation in local permit costs (e.g., 8-100 Euro/day)

Luxembourg

See: http://www.luxembourg.co.uk/fish_inland.html

- bag limits and size limits
- public and private water licenses
- licenses differ for bank and boat fishing

New Zealand

See: http://newzealandfishing.com/fishing_regulations/

- some variation by district (13 districts on North and South Islands)

- size limits
- bag limits
- designated fly fishing waters in most districts
- catch and release only on designated waters (e.g., North Cantebury, Otago)
- no additional non-resident license fees (day, week season licenses)

Norway

- fishing rights on private lands reside with the landowner
- saltwater angling is free
- national fishing permit (~$40) and a local permit ($10-$25/day) (and/or permission) required
- limits vary regionally
- few limits, no catch and release

Slovenia

- some catch and release areas
- lower permit costs for catch and release
- mainly day permits
- flyfishing only waters
- restrictive bag limits
- barbless hooks encouraged

United Kingdom

See: http://www.environment-agency.gov.uk/subjects/fish/246986/?version=1&lang=_e

- national angling license required
- national and regional byelaws
- local permits required
- >5000 angling clubs
- catch & release permits at some sites require barbless hooks
- variable local regulations of private waters
- includes limited number of catch and release fish (see sample limits below)
- fly fishing only waters

Example – Willington Lake Trout Fishery, Willington, Derby

Day Ticket Prices

Sporting Ticket	**(Catch and Release 10 fish)**	**£10.50**
Two Fish Ticket	**(Keep two fish and release eight)**	**£14.00**
Four Fish Ticket	**(Keep four fish and release six)**	**£19.00**
Season Ticket	**(Catch and Release 10 fish per visit. Also includes a bonus 10 fish to take)**	**£350.00**

From: http://www.fisheries.co.uk/willington/index.htm

Example – Kingfisher Trout Lake, Bromyard, Hereford

Day Ticket costs

Ticket type	Cost
Two Fish Ticket	£13.00
Four Fish Ticket	£22.00
Adult + Junior Shared Four Fish Ticket	£22.00
Eight Fish 'Sporting' Ticket (Catch and Release)	£11.00
Follow on Five Fish 'Sporting' Ticket (Catch and Release)	£7.00

From: http://www.fisheries.co.uk/kingfisher/index.htm

APPENDIX C Sources for North American Fish/Aquatics Education Programs

NOTE – *The following information makes no claim to being comprehensive, but represents a good cross-section of education programs for fisheries and aquatics in North America.*

British Columbia - http://wlapwww.gov.bc.ca/fw/fish/pdf/fish_key.pdf

Alberta – http://www3.gov.ab.ca/srd/fw/fishing/index.html
Fish identification guide and quiz on-line. Developed a dichotomous key to identification of Alberta salmonids. The key and test is also used at public events. Most notable is the Alberta Government Web site for fish identification found at http://www3.gov.ab.ca/srd/fw/fishing/FishID/index.html .
Here anglers are able to learn about the fish they may encounter and then take a voluntary online test to determine their ability to identify.

Saskatchewan - http://www.se.gov.sk.ca/fishwild/

Manitoba - http://www.gov.mb.ca/conservation/fish/images/fishkey1.pdf
Manitoba also offers a Web site that includes some information on fisheries and how they are a valuable resource. It is geared towards school aged children and more information can be found at http://www.gov.mb.ca/conservation/sustain/index.html

Ontario - http://www.mnr.gov.on.ca/MNR/fishing/fact.html

Quebec - http://www.fapaq.gouv.qc.ca/en/publications/fishing/html_2003/
Quebec also offers the 'Wildlife and You' program which is designed for students in Grade 6. It encourages students to ask about the conditions that must be in place for the renewal of wildlife resources. More information can be found at http://www.fapaq.gouv.qc.ca/en/educ/faune.htm

Nova Scotia has species factsheets that are found at http://www.gov.ns.ca/nsaf/sportfishing/species/index.htm
Also offered are some educational courses about the environment none are specific to anglers only. More information can be found at http://www.gov.ns.ca/nsaf/programs/programs.htm#fish

New Brunswick offers a number of conservation education programs although once again none are geared towards anglers specifically. More information can be found at http://www.gnb.ca/0078/fw/huntered/programs-e.asp

Prince Edward Island government fisheries page can be found at http://www.gov.pe.ca/af/faa-info/index.php3

Newfoundland has a species page which is located at http://www.gov.nf.ca/fishaq/species/species.stm

Yukon has a good identification page at http://www.environmentyukon.gov.yk.ca/yukonfishing/species.html

The Yukon also offers a number of education classes though once again none are aimed specifically towards anglers. More information can be found at http://www.environmentyukon.gov.yk.ca/cons/edyouth.shtml

North West Territories has fishing information and fish identification summaries available at http://www.nwtwildlife.rwed.gov.nt.ca/fishing/before_you_fish.htm

The sport fishing guide for **Nunavut** can be found at http://www.gov.nu.ca/Nunavut/English/departments/DSD/fishsum.pdf

Unites States

Alabama has no required education for anglers. They do have a fairly extensive Web site with information for anglers about fish, fishing and Alabama's water resources. It is at http://www.dcnr.state.al.us/agfd/fishsec.html

Alaska has educational and outreach programs in their elementary schools and does supply handouts to anglers on how to identify fish species. They also have a downloadable key on their Web sites. These can be found at
http://www.sf.adfg.state.ak.us/statewide/regulations/2001/html/pdfs/01ayksalmonid.pdf
http://www.sf.adfg.state.ak.us/statewide/regulations/2001/html/pdfs/01scrockfish10pdf.pdf

Arizona has no mandatory education for anglers although they do have a Sport Fishing Education program designed to promote awareness, appreciation and support for Arizona's recreational fishing opportunities. There are also components within this program for teachers to use in the classroom. More information can be found at
http://www.azgfd.com/i_e/sport_fish_education.html
There is also a web page developed for fish identification which can be found at
http://www.azgfd.com/h_f/sport_fish.html

Arkansas has an informative Web site with regards to angler education and a comprehensive angler education program. The purpose of the Arkansas Game and Fish Commission's Aquatic Resources Education Program is to increase public awareness and understanding of our natural resources and our aquatic ecosystems, to enhance participation in sport fishing, and to develop responsible attitudes toward the aquatic environment. All courses are voluntary. More information can be found at http://www.agfc.com/are/index.html or http://www.agfc.com/education_ol.html

California has no mandatory education although they offer some educational classes such as Project Aquatic, Fishing in the City and Classroom Aquariums. More information can be found at http://www.dfg.ca.gov/coned/index.html

Colorado has a well organized angler education program which includes aspects of aquatic biology, fishing techniques and species identification which is aimed at both young and old alike. Most programs are delivered through the parks and recreation system. More information on the programs offered can be found at http://wildlife.state.co.us/education/index.asp

Connecticut has no mandatory education although they do have a program called CARE (Connecticut Aquatic Resources Education) which is comprised of free classes and outdoor workshops which foster resource stewardship, promote an understanding of aquatic systems and

fishery management decisions and encourage both an understanding and utilization of aquatic resources. More information can be found at http://dep.state.ct.us/burnatr/fishing/care/care.htm

Delaware has an Aquatic Resource Education Centre that offers education relating to the outdoors. Much of it is geared towards school aged children. More information can be found at http://www.dnrec.state.de.us/fw/are1.htm

Florida also has no required angler education although they do have a very extensive Web site devoted to everything about fishing in Florida. It can be found at http://myfwc.com/fishing/ . They also have a good site developed for educators that details the classes offered and has resources available to teachers. It is at http://myfwc.com/educator/

Georgia has a fish identification page located at http://georgiawildlife.dnr.state.ga.us/content/displaycontent.asp?txtDocument=28

Hawaii has no mandatory education and very little information on its Web site for anglers in general. The Web site can be found at http://www.state.hi.us/dlnr/dar/index.html

Idaho has no mandatory education for anglers although they do have some voluntary education through programs such as Project Wild, Wet, Wetlands. Idaho does have threatened species in their waters and as a result have placed 4x6 signs in fishing areas of how to identify species and they do have technicians going out into the field with fish identification quiz boards to try and educate anglers. Idaho's online fish identification can be found at - http://www2.state.id.us/fishgame/common/regulations/fish/ident.pdf

Illinois has a Web site that offers information about fish identification and programs offered for young anglers. It is at http://dnr.state.il.us/fish/index.htm

Indiana - http://www.in.gov/dnr/fishwild/fish/fishng/fhident.htm
Indiana also has a well designed Natural Resources Education Centre designed to educate people about the environment. It can be found at http://www.in.gov/dnr/nrec/about/

Iowa has the standard programs geared for educators and children. More information can be found at http://www.iowadnr.com/education/index.html
They also have a good Web site for the identification of fish at http://www.state.ia.us/dnr/organiza/fwb/fish/iafish/iafish.htm

Kansas does not have required angler education nor do they seem to have any type of angler education available or fish resources on their Web site.

They do have some education courses available that are not specifically directed to anglers such as Project Wet whose goal is to promote awareness, appreciation, knowledge, and stewardship of water resources through the dissemination of classroom-ready teaching aids. Project Wild is also offered. More information can be found at http://www.kdwp.state.ks.us/education/wildlife.html

Kentucky has a very extensive fish information page at http://www.kdfwr.state.ky.us/navigation.asp?cid=138&NavPath=C101 which includes fish identification, aquatic plant and aquatic insect identification.
There are also abundant education resources for teachers and the public that can be found at http://www.kdfwr.state.ky.us/navigation.asp?cid=146&NavPath=C117 .

Louisiana offers introductory fishing classes although there is no required education. More information can be found at http://www.wlf.state.la.us/apps/netgear/index.asp?cn=lawlf&pid=314

Maine has a page devoted to fish identification at http://www.state.me.us/ifw/fishing/fishidentification.htm but no formal education is required for a license.
It also offers programs for school aged children, new anglers and instruction material for teachers. One program is the Hooked on Fishing-not-on-Drugs program. More information can be found at http://www.state.me.us/ifw/education/education.htm

Maryland has a number of educational programs geared for children and adults alike. More information can be found at http://www.dnr.state.md.us/education/index.asp

Massachusetts offers the Aquatic Resource Program and Aquatic Wild. Information can be found at http://www.state.ma.us/dfwele/dfw/dfweduc.htm#AEP

Michigan has a fish identification page available at http://www.michigan.gov/dnr/0,1607,7-153-10364_18958---,00.html but no real education opportunities directed specifically to anglers.

Minnesota has a web page with information about what species you can expect to find in their waters at http://www.dnr.state.mn.us/fishing/index.html .
Like many of the states in the US Minnesota is suffering from a decrease in anglers. To combat this they have developed the Hunter and Angler Recruitment and Retention Program. More information can be found at http://www.dnr.state.mn.us/harr/index.html

Mississippi has no required angler education and does not appear to have any information about education opportunities or fish identification on their Web site.

Missouri has an extensive Web site with much information available to the public. They have a section on exotic species at http://www.conservation.state.mo.us/nathis/exotic/ , fish identification at http://www.conservation.state.mo.us/fish/fishid/mofish/mofish.html and more general information at http://www.conservation.state.mo.us/fish/ .
They also have education classes offered for anglers of all ages and many resources for teachers. All can be found at http://www.conservation.state.mo.us/teacher/ .

Montana has one of the best Web sites available to anglers in terms of fish identification and ecology. Although they have no mandatory testing in place the pre and post analysis of the Web site quiz on identification shows anglers ability to correctly identify species increased after looking at the Web site and taking the quiz. Montana has education technicians going in to the fields to quiz anglers on species identification and they are quite aggressive in their education of anglers as to threatened species such as the bull trout. The Web site can be found at - http://www.fwp.state.mt.us/education/fishingeducation.asp
Also implemented an “adopt a trout” program to increase awareness of native trout with school children.
Montana is also one of the few states to make hunters take a mandatory test (apart from a course on firearm safety) to prove they are able to correctly identify black bear before they are given a permit.

Nebraska has no voluntary education programs in place and according to Daryl Bauer of the research fisheries division they are actually trying to encourage more people to angle and as a result have no closures of fishing areas ever nor do they have any intention of imposing

mandatory education for anglers. Although they are opposed to mandatory education they do have a well developed fish identification Web site where you can query based on family name, common name or the area the fish is found. To view these pages go to http://www.ngpc.state.ne.us/fish/fishes/

Nevada's fish identification Web site is quite detailed and can be found at http://ndow.org/fish/id/ The Nevada Department of Wildlife offers fishing clinics through its regional angler education programs for students of all ages. More information can be found at http://ndow.org/ed/fish/index.shtm

New Hampshire offers a program called Let's Go Fishing. which is part of the New Hampshire Fish & Game Department's Aquatic Resources Education Program. Courses are designed to teach families basic ecological concepts and fishing skills. More information can be found at http://www.wildlife.state.nh.us/Fishing/lets_go_fishing.htm .
They also have a page devoted to the profiles of common fish in New Hampshire which can be found at http://www.wildlife.state.nh.us/Fishing/fish_species_profiles.html

New Jersey educational programs are supported by the Federal Aid in Sport Fish Restoration program (often called "Wallop-Breaux" for its congressional authors), is funded by anglers through a tax at the manufacturer's level on fishing equipment and motor boat fuels. The program supports NJ's Marine, Coastal and Aquatic Education programs by making educational resources available to NJ educators. For a complete list of the classes offered please go to http://www.state.nj.us/dep/fgw/aqtedres.htm .
Fish fact sheets on common New Jersey species can be found at http://www.state.nj.us/dep/fgw/fishfact.htm

New Mexico has gone so far as to close all waters that endangered species are found to fishing. Of primary concern is the Hela trout.
New Mexico also has a Project Wild which is designed for educators of kindergarten through twelfth grade. Project WILD capitalizes on the natural interest children and adults have in wildlife by providing hands-on activities that enhance student learning in all subject and skill areas. More information can be found at http://www.gmfsh.state.nm.us/PageMill_TExt/Education/projectwild.html
The Aquatic Resources Education (ARE) program has three related projects that are designed to promote learning about the aquatic environment, angling skills, outdoor ethics and fishing opportunities in the state. The program is mostly funded by anglers through the money provided by the Sports Fish Restoration Act- a federal program that taxes the equipment used by anglers. More information can be found at http://www.gmfsh.state.nm.us/PageMill_TExt/Education/frame119786.html#anchor109097

New York offers an information page about common species and this con be accessed at http://www.state.nj.us/dep/fgw/fishfact.htm

North Carolina offers a number of aquatic/angler education course including Mobile Aquarium, Angler Recognition Program and Caring for Aquatics through Conservation. More information can be found at http://www.ncwildlife.org/fs_index_03_fishing.htm .
A Pocket Guide book for identification of North Carolinas' fish species is available at http://www.ncwildlife.org/fs_index_03_fishing.html . Also available are wildlife profiles that can be viewed, printed and duplicated. These can be found at http://www.ncwildlife.org/fs_index_08_education.htm

North Dakota takes part in the National Project Wild Program. More information can be found at http://www.state.nd.us/gnf/education/projwld-aquaticsowls.html

Ohio's Web site gives information about the life history of commonly caught species, as well as information on selected threatened and endangered species. Color illustrations and/or pictures are offered for many species, including those which are rarely caught by anglers. It can be found at http://www.dnr.state.oh.us/wildlife/Fishing/aquanotes-fishid/fishtips.htm

Oklahoma's position on mandatory angler education is it's the publics' responsibility to utilize the resources made available to them by the fisheries department and to know the rules governing fishing. To this end they provide voluntary fishing clinics for new anglers which include an element of fish identification. The course is primarily to stop the attrition of anglers the state is experiencing. For more information go to http://www.wildlifedepartment.com/aquated.htm

Oregon has an angler education program designed for young adults and more information can be found at - http://www.dfw.state.or.us/outdoor_skills/
Further detailed information about fish habitat and identification can be found on the Oregon Web site at http://www.dfw.state.or.us/ODFWhtml/InfoCntrFish/InfoCntrFish.html

Pennsylvania's Department of Conservation and Natural Resources boasts that it maintains the largest conservation and environmental stewardship education program in the commonwealth and although there is a lot of environmental education offered there is nothing specific for anglers. More information can be found at http://www.dcnr.state.pa.us/education/
There does not appear to be any information available in terms of fish biology or identification for anglers fishing in Pennsylvania's waters.

Rhode Island offers a guide to commonly caught fish and shellfish available at http://www.state.ri.us/dem/programs/bnatres/enforce/pdfs/multibro.pdf

South Carolina participates in the Project Wild program and more information can be found at http://www.dnr.state.sc.us/etc/education.html
There dost not seem to be any information readily available for fishermen in regards to fish biology or identification.

South Dakota has a list of common species available at http://www.state.sd.us/gfp/divisionwildlife/fishing/CommonSDFishes/Index.htm
Project Wild is also offered and although not specific to angling it dies offer components of aquatic information. More information can be found at http://www.state.sd.us/gfp/DivisionWildlife/Projwild/Index.htm

Tennessee does not seem to offer information on local fish species or education programs for anglers.

Texas offers a fish identification Web site at http://www.tpwd.state.tx.us/fish/infish/species/
They also have a number of resources available to teachers at http://www.tpwd.state.tx.us/edu/ and they also participate in the Project Wild program.

Utah has a Web site similar to Montana's bull trout page for fish identification. They do have some education for children although it is geared primarily towards outdoor ethics more than anything. More information can be found at http://www.wildlife.utah.gov/ae/are.htm
Utah also participates in the Project Wild program information can be found at http://www.wildlife.utah.gov/projectwild/

Vermont offers no fish identification tools although they do have a useless list of Vermont fish species and their Linnaeus classification order which can be found at http://www.anr.state.vt.us/fw/fwhome/html/fishlist.htm
Once again there does not appear to be any type of angler education offered.

Virginia offers a well developed fish identification page at http://www.dgif.state.va.us/fishing/virginia_fishes/index.html
Also offered is the Sport fishing & Aquatic Resource Education Program but this is aimed primarily at attracting new anglers. More information can be found at http://www.dgif.state.va.us/fishing/sarep/index.html

Washington has a Trout and Salmon Fishing identification guide at http://www.wa.gov/wdfw/outreach/fishing/t&sid.pdf

The Angler Education program is also offered and it is based on 5 main principles –

- A thorough knowledge of fish and fishing is the first step in a lifelong learning and growing process
- Sportsmanship and ethics are the keys to continued fishing enjoyment
- Fisheries regulations and fish management activities are essential to the health of our fish populations
- Fish can't live without clean water and adequate habitat
- Safe fishing and boating practices lead to pleasant, memorable outings

This is a voluntary course taught by volunteers but it dose seem to be one of the better ones. More information can be found at http://www.wa.gov/wdfw/outreach/fishing/aed.htm

West Virginia has a good fish identification page at http://www.wvdnr.gov/fishing/sport_fish.asp
Not much was fond in terms of angler education available to the general public.

Wisconsin has a substantial voluntary angler education program aimed at both school aged children and adults alike. It includes fish biology, identification, aquatic plants and fishing skills. Melissa Brunner, aquatic education program manager, sent detailed information and course material which can be found along side the Wisconsin Fishing Guide. The Web site can be found at http://www.dnr.state.wi.us/kidstuff/

APPENDIX D Hunter Education Programs and Mandatory Education Requirements for Hunting Licenses in North America (2003)

Table D-1 United States hunting education by State

State	Hunter Ed. Prgrm	Mandatory for License	Wildlife/ Envmtl Content	Exam Required	Course/ Exam Cost ($)
AL	Yes	All born after Aug 1 1977	Yes	Yes:	
AK	Yes	Hunters in Units 7, 13-15, 20 born after 1986, < age 16 must hunt with adult with course, Also required of all hunters in specific areas	Yes	Yes	10
AZ	Yes	For 10-14 year-olds wishing to hunt big game	Yes		0-8
AR	Yes	If born after Dec 31, 1968	Yes	Yes	Free
CA	Yes	All first time license buyers	Yes	Yes	Minimal fee
CO	Yes	Anyone born after Jan 1, 1949	Yes	Yes	Up to 10
CT	Yes	All persons who haven't held a resident firearms license in past 5 years (or 1st time licensee)	Yes	Yes	Free
DE	Yes	All born after Jan 1 1967	Yes	Yes	
FL	Yes	All born on/after June 1, 1975	Yes	Yes	Free
GA	Yes	All born on/after Jan. 1 1961 (except for 1 or 7 day licenses), <12 year olds not required unless hunting on National Wildlife Refuges or Park Service lands, not required on own land (or parents'/guardian)	Yes	Yes	Free
HI	Yes	All, except hunters born before Jan 1 1972 that have purchased a Hawaii license before July 1 1990	Yes	Yes	Free
ID	Yes	All born after Jan 1, 1975	Yes	Yes	8
IL	Yes	All born on/after Jan 1 1980	Yes	Yes	Free
IN	Yes	All born after Dec 31, 1986	Yes	Yes	Free
IA	Yes	All born after Jan 1, 1967	Yes	Yes	Free
KS	Yes	All born on/after July 1, 1957	Yes	Yes	Free
KY	Yes	All born after Jan 1, 1975. Except: <10 age can hunt with adult, those exempt from requiring hunting licenses	Yes	Yes	Free
LA	Yes	All born on/after Sept 1, 1969	Yes	Yes	Free
ME	Yes	All, except for those that have held license to hunt with firearms on/after 1976	No	Yes	Free
MD	Yes	All born after July 1 1977. Except: non-resident waterfowl hunters	Yes	Yes	Up to 6
MA	Yes	Required of all hunters unless the person has held a license to hunt before Jan 1, 1997	Yes	Yes	Free
MS	Yes	All born after Jan 1, 1960	Yes	Yes	Free
MN	Yes	All born after Dec 31, 1979 for small or big game license	No	Yes	10
MI	Yes	All born on/after Jan 1, 1972	Yes	Yes	Free
MO	Yes	All born on/after Jan 1, 1967. Except: youth Deer or Turkey Hunter Permit for 6-15 yrs old	Yes	Yes	Free, but may have minimal charge ex. 3-5
MT	Yes	All born on/after Jan 1, 1985	Yes	Yes	Free for Youth
NB	Yes	All born on/after Jan 1, 1977	Yes	Yes	Free
NV	Yes	All born after Jan 1, 1960	Yes	Yes	5

Table D-1 Continued

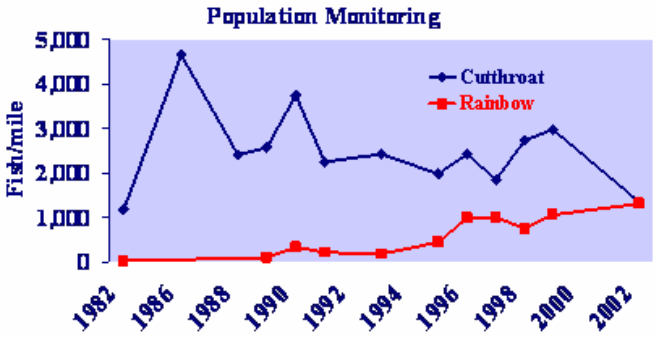
State	Hunter Ed. Prgrm	Mandatory for License	Wildlife/ Envmtl Content	Exam Required	Course/ Exam Cost ($)
NH	Yes	All, unless have held a previously issued license of the same type (min age 12)	Yes	Yes	Free (nominal fee for facility, instructor costs)
NJ	Yes	All first time licensees (10-13 yr olds must be accompanies by licensed adults 21 yr or older)	Yes	Yes	Free
NM	Yes	All persons under the age of 18 before hunting with a firearm	Yes	Yes	5
NY	Yes	All first time hunting license buyers	Yes	Yes	Free
NC	Yes	All hunters except those that have held a hunting license prior to July 1, 1991	Yes		Free
ND	Yes	All born after 1961	Yes		5
OH	Yes	All first time hunting license buyers	Yes	Yes	Free
OK	Yes	All born on/after Jan 1, 1972. Except: current, honorably discharged members of US armed forced or member of National Guard	Yes	Yes	Free
OR	Yes	All under 18 years old. Except on own, parent, or legal guardian's land)	Yes	Yes	10
PA	Yes	All hunters that have not held a hunting license in this commonwealth or another state or nation	Yes	Yes	Free
RI	Yes	All hunters except those that have held a prior (Rhode Island) hunting license. Except: persons serving in or honorably discharged from: Army, Navy, Air Force, Marine Corps, Coast Guard	Yes	Yes	Free
SC	Yes	All residents and nonresidents born after June 30, 1979	Yes	Yes	Free
SD	Yes	All under the age of 16	Yes	Yes	
TN	Yes	All born on/after Jan1, 1969	Yes	Yes	Free
TX	Yes	All born on/after Sept 2, 1971. Age 12-16 must either have a hunter education course or accompanied by an adult * not a condition of obtaining license, but must carry proof of certification while hunting	Yes	Yes	10
UT	Yes	All born after Dec 21, 1965	Yes	Yes	6
VT	Yes	All first time hunting license buyers	Yes	Yes	Free
VA	Yes	All 12-15 year olds, first time license buyers 16 years and older			Free
WA	Yes	All first-time hunting Washington license buyers and those born after Jan 1, 1972	Yes	Yes	Free
WV	Yes	All born on/after Jan 1, 1975	Yes	Yes	Free
WI	Yes	All born on/after Jan 1, 1973	Yes	Yes	Free
WY	Yes	All born on/after Jan 1, 1966 except for hunting on own family land	Yes	Yes	5

Table D-2 Canadian hunting education by Province and Territory (2003)

Province or Territory	Hunter Ed. Prgrm	Mandatory for License	Wildlife/ Envmtl Content	Exam Required	Course/ Exam Cost ($)
AB	Yes	All 12 and 13 yr old hunters. Age 14 and older must take the course or challenge the First Time Hunter Test	Yes	Yes	Free
BC	Yes	All age 14 and over. No education requirement to get a non-resident license	Yes	Yes	10 for each test, 30 for certificate
MB	Yes	All first-time hunters –anyone that wasn't 19 in 1969 and did not have a license before	Yes	Yes	35
NB	Yes	All born on/after Jan 1, 1981, and all first time hunters	Yes	Yes	50-106 depending on age, if taken with firearm course
NF	Yes	All first-time hunters	Yes	Yes	35 –firearm 15 -hunter ed
NS	Yes	All first-time hunters	Yes	Yes	50-firearm 20 -hunter ed
ON	Yes	All applicants for hunting licenses	Yes	Yes	Up to 68
PEI	Yes	All first time hunters, and all born on/after Sept 1, 1968 Not required of aboriginals	No	Yes	50, free if under 18
QB	Yes	All persons purchasing hunting license	Yes	Yes	
SK	Yes	All applicants under 18 years old, all first time hunters	Yes	Yes	0-25
NT	Yes	Voluntary		-	-
NU	Unknown	-	-	-	-
YK	Yes	All born after April1, 1987 except aboriginals in traditional hunts, sustenance hunters	Yes		Free

APPENDIX E Poster and brochure from the Snake River, Idaho

ANGLERS: THE WORLD FAMOUS SOUTH FORK CUTTHROAT FISHERY IS IN YOUR HANDS



The Yellowstone cutthroat trout population in the South Fork of the Snake River is in serious jeopardy. Non-native rainbow trout are hybridizing with and rapidly displacing the rivers' native cutthroat. The South Fork provides Idaho's last large river fishery for Yellowstone cutthroat trout.

Loss of this population could not only have dire implications for Yellowstone cutthroat trout fisheries throughout the west, it would mean the loss of a key component in the incredible diversity of trout fisheries that Southeastern Idaho is famous for.

WHAT CAN YOU DO TO SAVE CUTTHROAT TROUT?
Trout Unlimited and Idaho Fish and Game urge you to:
1) Harvest rainbow and hybrid trout in the South Fork; and
2) Release Yellowstone cutthroat trout

The South Fork is home to one of the strongest remaining Yellowstone cutthroat populations.

The Yellowstone Cutthroat Trout

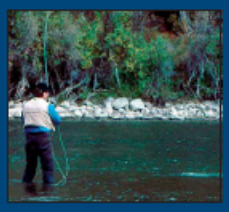
Yellowstone cutthroat trout are a subspecies of cutthroat native to the upper Snake and upper Yellowstone River drainages. Although once widely distributed throughout southeastern Idaho, southwestern Montana, and western Wyoming, Yellowstone cutthroat have been lost in much of their historical range. The South Fork of the Snake River is home to one of the strongest remaining populations of Yellowstone cutthroat trout and is known world wide for the fishery these unique native fish provide.

Why are Yellowstone Cutthroat Trout Important?

Yellowstone cutthroat trout support one of the states' most popular fisheries. Because cutthroat trout often feed aggressively and can grow to large sizes, they are a favorite with South Fork anglers. The South Fork has long been known as a river that can produce daily catches of over 50 fish per person!

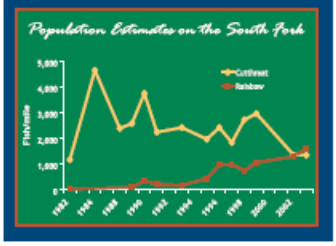
The cutthroat fishery in the South Fork is unlike any other, anywhere. It is extremely important for the diversity it provides to the region and Idaho. Nearby rivers, such as the Henrys Fork currently offer world-class fishing for rainbow trout. Upper Snake waters also provide outstanding brown trout and brook trout fishing, making it a Mecca for trout anglers. The unique, native South Fork cutthroat fishery is a key component in the incredible diversity of fishing that Idaho and the Upper Snake is famous for.

Thanks to Yellowstone cutthroat, the South Fork is famous for producing catches of over 50 fish per day.



The Rainbow Threat

Rainbow trout were introduced into waters throughout the world, and the South Fork was no exception. Although stocking ended in the 1980's, the rainbow trout population began to expand in the early 1990's along with an increasing number of hybrids (cutthroat-rainbow crosses). Annual population estimates indicate the number of rainbow and hybrid trout is rapidly increasing. Many anglers may not realize that hybrid trout are fertile therefore the threat of hybridization increases as the number of rainbow trout increases.



What Can Be Done?

Simply stated, we need to reduce the number of rainbow trout in the South Fork. Unfortunately, time is running out. A three-pronged effort is now focused on managing flows, tributaries, and harvest.

Flow Management

Researchers with Idaho State University, IDFG, and the Bureau of Reclamation have learned that the shape of spring and early summer flows plays an important role in determining whether rainbow or cutthroat trout have a reproductive advantage. A pronounced peak in springtime flows (resembling natural runoff) favored cutthroat recruitment, whereas years with a gradual increase and minimal decrease in spring and summer flows favored rainbow trout. The Bureau of Reclamation is now working with water users to modify winter and spring flows to give cutthroat the advantage over rainbow trout. In the coming years, IDFG will monitor juvenile recruitment to gage success of the efforts and help refine flow management.

Tributary Management

Cutthroat trout rely largely on tributaries for spawning and early rearing. Preventing rainbow trout from invading the tributaries is one tool for reducing hybridization. Fish trapping facilities have been constructed on the four main tributaries to allow collection of all trout migrating upstream to spawn. The traps are tended daily, and only pure cutthroat trout are passed. Rainbow and hybrid trout are transported to other regional waters where they won't threaten cutthroat trout. Although these weirs will protect core areas of genetically pure fish, they will not curb the expansion of rainbows or protect the genetic purity of cutthroat in the mainstem.

Harvest Management

In 2003 anglers fished over 215,000 hours on the South Fork and handled a large percentage of the river's trout. Anglers clearly can play an important role in giving cutthroat trout an advantage over rainbow trout. But success depends on all of us. In 2003, anglers harvested over 5,000 rainbow trout—up from only a few hundred in previous years. While that is an encouraging start, over 24,000 rainbow trout were handled and released. Because of a strong catch-and-release ethic many anglers cannot bring themselves to harvest a wild trout. Though this ethic has clearly done wonders for the world's trout fisheries, it is time to recognize there is a place for a "catch and keep" ethic as well.

To help anglers give cutthroat trout an advantage, IDFG modified regulations on the South Fork. Beginning in 2004, anglers are allowed to keep an unlimited number of rainbow and hybrid trout, but must release all cutthroat trout. Furthermore, the entire river is now open to year-round fishing, allowing anglers an opportunity to fish for spawning rainbow trout. Finally, the major tributaries are closed until July 1 to give cutthroat an opportunity to spawn without being disturbed.

Anglers are now playing an important role in the effort to maintain the South Fork cutthroat fishery for future generations.

What Can You Do?

Nobody expects to be able to rid the river entirely of rainbow trout, but if anglers stop releasing those they catch, their abundance relative to cutthroat trout would quickly decline to manageable levels. You can help by:

- Harvesting a rainbow or hybrid—and don't feel guilty. Instead, feel satisfied that you're helping preserve a valuable native fishery.
- Tolerating (*and encouraging*) others to harvest rainbows and hybrids. Many anglers follow the lead of others and are only willing to help if they don't incur the wrath of their peers.

How Can You Tell A Hybrid?

Yellowstone Cutthroat

Rarely any spots on head

Spots more dense toward tail

Does not have white-tipped fins

Slashes under jaw

Rainbow X Cutthroat Hybrid

Usually has spots all over body and often on head

Pinkish stripe along body

White-tipped anal and pelvic fins

Slashes under jaw

Rainbow Trout

Spots all over body and often on head

Pinkish stripe along body

White-tipped anal and pelvic fins

No slashes under jaw

Attention Anglers!

The World Famous Yellowstone Cutthroat Fishery in the South Fork of the Snake River is in Your Hands

TROUT UNLIMITED