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To: Don McIsaac, ODFW, Portland

Subject: Introduced Fishes Management Strategy

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General Comments:

Thank you for requesting our review of this document. Five members of the Chapter familiar with introduced fishes reviewed it. The report is a good effort but does not capture the tone of the recent workshop*, Management Implications of Co-occurring Native and Introduced Fishes*. Many of the presentations at that workshop described negative effects of introduced species that were not reflected in your report. Your report also ignores a large body of refereed literature on alien species, and appears to have a very strong angler-centric perspective. Additionally, there are at least two important technical issues missing from your report: (1) the role of exotic diseases, and (2) indirect effects often manifested as changes in food web structure affecting the species of interest. Food web changes include reducing the food base for the prey upon which target species depend and changing the competitive advantages among species. Stocking is also considered an important mechanism for disease transmission.

Also missing was a coherent set of management principles upon which to base policy, i.e., the ecological criteria needed to protect ESA and native species. We recognize the social and ecological constraints of managing introduced species and anglers. For instance, when social and ecological criteria are in conflict, which takes precedence? Beamesderfer (1999) and Giles (1978) suggested that "importations are an admission of defeat in managing native populations to meet existing needs," i.e., the last resort. If this is made clear to the public, then conflicting interests and double standards may be minimized. There are several criteria available to use as models in the peer reviewed scientific literature. These, however, are primarily concerned with the act of introduction itself rather than managing the introductions (e.g., Kohler and Stanley 1984; Kohler and Courtenay 1986; Li and Moyle 1981; Moyle et al. 1986; Ahmad et al. 1988; Li and Moyle 1993; Moyle and Light 1996).

Having said that, we predict that the decisions below will be irritants to both cold water fishermen and advocates of non-game native species. It is clear that ODFW

does have a policy of limiting the use of alien species and its goals are laudable, but the crux of this report really revolves around the continued use of alien game fishes. Important issues of forage fish introductions, aquarium releases, and aquatic pest control are ignored or only lightly touched upon. This is interesting in that a recurring theme in this report is the license and revenue generating potential of alien game fishes and the expectations of that clientele -- expectations, not incidentally, engendered by historical patterns of game fish introductions by state and federal fishery agencies. Reading between the lines, one gets the impression that the report tries to justify license dollars from alien species as "making a silk purse out of a sow's ear" (note -- does this refer to taking advantage of a messed up habitat that is no longer suitable for native spp? If so, see following suggested addition.) and going for the mythical "win-win" strategy. This is particularly troubling when one of the presentations made during the workshop (Lassuy 1999) made it clear that habitat alteration and severe impacts from introduced fishes are not inextricably linked. We suspect that an angler-centric perspective will result in continued degradation of native fishes and aquatic ecosystem integrity.

This attitude emerges from the report in interesting ways. For example, there are different standards for non-game vs. game fishes. The native northern pikeminnow and the introduced smallmouth bass are ecological analogs. Both are facultative piscivores. Yet harvest (bounty) for one species is justified as being good for salmon and effective; whereas, harvest is deemed ineffective for the other (e.g., see page 26 about control of walleyes and channel catfish). Is it mere coincidence, that smallmouth bass is judged to be the lesser of two evils? On page 21, the suggestion is made that "One result (of alien controls) may be that other non-targeted species, originally held in check by the introduced species, may increase in abundance and negatively interact with the native species". This is a logical stretch and has the flavor of game fish bias.

It is also suggested that (page 20) "One of the healthiest populations of the endangered shortnose sucker occurs in Gerber Reservoir, where largemouth bass, white crappie and yellow perch are also found." This is an assertion that has to be treated carefully. What is the age/size structure of the sucker? Have there been successful year classes of recruits in recent years or are all fish old? Many suckers can live beyond 40 years of age. Is the population healthy only by comparison to the other endangered populations, but not of historical abundance? Although the size distribution and population size of suckers in the reservoir indicate a healthy population, this should be indicated in the report. It might also be noted that the large population of fathead minnows may alleviate bass predation on juvenile suckers in Gerber.

The walleye strategy appears based on fishing pressure. Since most predation on salmonids by walleye is by fish <18", these size classes are fished hard and the species is managed for a trophy fishery. However, the problem of smolt predation by walleye is significant (Rieman et al 1991) and may be underestimated because

the original estimate was obtained when walleyes were at the low end of population fluctuations in the John Day Reservoir (Zimmerman 1999). Protecting trophy walleye fails to consider the much greater reproductive contribution of these individuals to the population, and the subsequent population growth of the <18" walleye.

Channel catfish have a relatively weak base of fishermen support and their predation on salmonids may be significant. The agency, therefore, proposes to manipulate reservoir levels to reduce backwater spawning areas.

Largemouth bass are popular game fish, and there are no changes in management policy. We agree with the Tenmile Lakes assessment (see Dambacher et al. 1999) "Mathematical community models suggest that management through alteration of food chain or species composition is hopeless". By the way, recruitment of centrarchids in reservoirs can also be inhibited by fluctuations in reservoir levels.

Smallmouth bass are very popular game fish. Essentially no changes in management policy are proposed because ODFW studies indicate no deleterious impacts. This seems inaccurate and this report ignores several recent publications. Tabor et al. (1993) found that smallmouth bass were twice as voracious on wild salmonid smolts as northern pikeminnow in the Hanford Reach of the Columbia River. Zimmerman (1999) states that past studies of smallmouth bass have underestimated their predation effects and that they will prey upon more small salmonids than pikeminnows at the same place at the same time. McMichael et al. (1999) estimate that 0.5 million smolts are consumed by smallmouth bass in the lower Yakima River during the migration pulse. This report confines smallmouth bass to the lower portions of the John Day River. This is inaccurate. Unterwegner (1999) reports finding them upstream near highway 395 up the North Fork John Day and near Mount Vernon, Oregon on the upper mainstem John Day River. Li et al. (1991) and Frisell (1996) found smallmouth bass cohabitating with juvenile salmonids (chinook salmon and redband trout) up basin. In fact, Ebersole (pers. comm., Dept. Fisheries and Wildlife, OSU) observed juvenile smallmouth bass chasing juvenile redband trout and his data suggest that they are competitively displacing redband trout in the lower Grande Ronde. Smallmouth bass are coolwater fish and have just begun to expand their ranges after population build-up. Frissel et al. (1996) suggests that land use activity that damages riparian zones can increase water temperatures, thus facilitating upstream invasions of smallmouth bass. Coincident with such changes, the range of smallmouth bass has increased in the Calapooia River; none were collected in 1983, yet in 1997 they were a codominant (R. M. Hughes, pers. comm., Dynamac Corp., Corvallis). Loomis (1999) suggests that Umpqua pikeminnow and lamprey declines might be attributed to smallmouth bass introductions. If the Umpqua pikeminnow are like their northern cousins, this does not confer advantages to juvenile salmonids. Recall that smallmouth bass are twice as voracious as the pikeminnow and are their ecological analogs. Moreover,

Pacific lamprey (*Lampetra tridentata)* are key predation buffers for salmonids (Close et al. 1995) from marine mammals, Caspian terns, pikeminnows, and obviously smallmouth bass. They are important prey for white sturgeon and return nutrients to the watershed as they die after spawning. This is a species likely to be listed as threatened (Loomis 1999). 35,000 lamprey were counted at Winchester Dam in 1965, 497 in 1992, about 100-200 1997. Hughes (pers. comm., Dynamac, Corvallis) found that the mainstem Umpqua in summer 1998 was dominated by largescale sucker and smallmouth bass, with essentially no other species present. The absence of sculpins, lampreys, and small minnows was strikingly different from the other 6 Coast Range rivers sampled where smallmouth were absent. These prey fishes were also rare in the lower John Day and Calapooia rivers. Markle (pers. comm., OSU, Corvallis) found that smallmouth bass, particularly age 0, was much more widespread and abundant in a 1998 Umpqua survey than in an identical 1987 survey. On the other hand, Umpqua chub was much less abundant in 1998, appeared restricted to lower order tributaries, and had disappeared from several mainstem sites.

Striped bass are a popular sport fish in decline, but there is little data. Don Stevens (pers. comm., California Fish and Game, Delta Research Station) documented that 85% of stripers' diets were juvenile salmonids during the peak of the migration run. This evidence was so damning that California disposed of $3,000,000 worth of hatchery stripers in order to preserve the threatened winter run chinook salmon in the Sacramento River. Current management calls for reduced hatchery supplementation of stripers in Oregon.

Lake trout are another popular sport fish that is still stocked. The report asserts that protection of lake trout reduces the accidental take of bull trout. The detrimental effects of lake trout predation and competition on bull trout are not considered. Problems with angler discrimination between the two chars are ignored also. However, a recent study of Montana anglers indicated that fewer than half could correctly differentiate bull trout from other salmonids (Schmetterling and Long 1999). The current emphasis in the Flathead Lake ecosystem <u>is not to protect</u> lake trout, but to manage for bull trout instead (J.A. Stanford, pers. comm., Flathead Lake Biological Station, Polson, MT).

Brook trout are a commonly acknowledged danger to bull trout and recommended for stocking only in waters without access to bull trout populations. The department recommends experimenting with eradication procedures. Given the widely recognized threat of brook trout to resident amphibians in previously fishless Cascade lakes (e.g., Tyler et al. 1998), continued stocking may also be an unwise policy from a wildlife perspective. The fact that the Department has insufficient data to indicate an effect does not mean there is none; rather it indicates a need for additional research and possible moratoria on stocking these lakes.

The use of grass carp is mentioned briefly (Buckman and Daily 1999). The data are still of a preliminary nature, but it is an intriguing hypothesis to use grass carp for managing weed infestations that can limit warmwater aliens and restore salmonid habitat. A community model should be used to estimate what important mechanisms lead to this outcome and to devise a test of this hypothesis elsewhere.

The discussion concerning penalties and factors motivating anglers to obey rules and their use of bait bucket introductions as extortion threats was thought provoking (see Horner 1999). This is a conflict of cultural values impeding Department goals and we are surprised that more was not made of intensifying educational outreach. Only three lines referenced education. We can and should do much more here to educate the public about the dangers of exotics. For instance, the OSU Extension Service produced a video called *Strangers in our Waterways*. Yellowstone National Park purchased a copy for its Visitor Center. This and many other excellent educational materials should get much more attention to both reduce illegal introductions of gamefish or aquarium species, and to encourage destruction of all unregulated aliens by anglers.

Throughout the document, it is suggested that changes to angling restrictions on alien species are unlikely to be effective. However, at the workshop it was stated that angling restrictions on alien piscivorous fishes would produce a standing stock of the predator with a much smaller average size than under restricted fisheries . Other participants illustrated that these smaller predators would be less piscivorous.

The report also states that incentives to increase angler harvest would be expensive, and only marginally successful (p. 26). First, the statement about marginal effect should be explored. No reference is made to an evaluation of the pikeminnow control program; has such an evaluation occurred? If so, what has it shown? Second, while the BPA pikeminnow control program is indeed expensive, not all programs must be administered in the same way. There are opportunities for some creative, experimental measures. Panfish or bullfrog in some high impact areas (identified in Tables 5, 6) could be subjected to a bounty fishery with appropriate evaluation. Who knows what would happen if we turn the 7-year olds of the Willamette Valley loose on aliens? Given the public fascination with lotteries, how about tagging some alien individuals and advertising the potential of a huge return for the price of a ticket? What is the potential of implementing fishing derbies on aliens? They seem to attract many paying customers in some waters of the nation.

The use of temperature regulation in the Rogue River to reduce introduced pikeminnows is a good idea and an example of imaginative fishery management. More can be done with dams to reduce recruitment of alien predators and to increase fish passage as well.

The focus of this report is on alien species, but its title is introduced species. This spring, 7 hatchery rainbow trout were collected in the Willamette River between the McKenzie River confluence and Corvallis, all but one below Peoria. ODFW indicated that the fish were probably released into the McKenzie River. They had assumed that these rainbow would not wander far from where they were released and would be caught soon after stocking. They did not expect that this stock of rainbow would travel far downstream and mingle with young wild steelhead near or within the Calapooia River. This is an example of the unforeseen consequences of introduced species, whether they are native or alien; i.e., many fish species have great dispersal powers and they often appear in unexpected places.

Specific Comments

Tables 1 and 5 - 8 and Appendix C should be modified to be consistent with the Oregon List of Threatened and Endangered Species, and the Oregon Sensitive Species List. Specifically: Pacific lamprey is sensitive throughout its range in Oregon, not only in the Umpqua basin. Bull trout is a sensitive species throughout its Oregon range. Coho salmon is a sensitive species through its Oregon range. Coastal cutthroat trout is a sensitive species in all coastal drainages below impassable barriers.

Oregon chub is an Oregon sensitive species. Lost River and shortnose suckers are listed as endangered under both the federal and Oregon endangered species acts. Millicoma dace is a sensitive species throughout its range in Oregon (Coos-Coquille basins). Hutton springs tui chub is listed as threatened under both federal and Oregon endangered species acts. The recently rediscovered Miller Lake lamprey may need to be added to these lists.

Tables 6-8 list waters where the impacts of alien species are unknown or minimal, but there is inadequate information about the research upon which these conclusions are reached. What sorts of sampling designs and indicators are needed to conclusively determine status and trends, and what is the statistical power of the indicators and design to do so?

There is evidence that the impacts of bluegill, Gambusia, and bullfrog on Oregon chub in the Willamette basin are significant (Scheerer et al. 1999). These aliens should be added to the list of threats to Oregon chub in the Willamette basin, and this element should be moved from Table 6 to Table 5 on p. 30. The discussion of predation and competition as management issues (pp. 10 - 22) focuses on principal game species interacting with other principal game species. Oregon chub appear to be detrimentally affected by minor game species (especially bluegill) and other introduced non-game species (e.g. Gambusia). Appendix C (p. 49) only partially addresses this concern.

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