Petition to Amend a Rule

State Fish and Game
Of the state of Oregon

IN THE MATTER OF THE AMENDMENT OF OAR 635-56-0075 CONTROLLED FISH SPECIES	))	Petition to Amend OAR 635-56-0075

1. Petitioner's name and address is Robert Camel 63075 Fresca St. Bend OR 97701

2. Petitioner is the President of Tumalo Fish and Vegetable Farms Inc.

The purpose of this amendment is to add barramundi to the list of controlled fish species and address five questions required by OAR 137-0001-0075

A; Options for achieving the existing rule's substantive goals while reducing the negative economic impact on business? The goals of the existing rules are not changed by this amendment. However the negative impact on future business is and the Petition to Amend corrects the negative impact on business and provides Oregonians a new high quality food source. Aquaculture in properly designed systems with regulatory over sight provides adequate protection for Oregon native fish. Installed away from lakes, streams or rivers in secure buildings would ensure the safety of native fish better than any other type of fish propagation systems currently used both public and private.

B; The continued need for the existing rule? The need for the existing rule does not be changed but can be expanded to recognize the high degree of safety in closed recirculating systems This request is to add another species (barramundi) to the existing rule under the same existing conditions as Tilapia.

C; The complexity of the existing rule? This Amendment to Petition to amend rule OAR 635-056-0075 would add Barramundi to the list of fish species and regulated like Tilapia. Although special status should be given to properly designed and run aquaculture systems because of the bio-security they offer. Fish and Wildlife have the expertise to understand these systems, regulate and enforce their proper use to the benefit of all Oregonians including their native fish and wildlife at minimal cost.

D; The extent to which to which the existing rule overlaps, duplicates, or conflicts with other state or federal rules and with local government regulations? Currently Barramundi is permitted to be propagated several states (Michigan, Massachusetts, Florida). I know of no Federal law prohibiting propagation of Barramundi as a selected species.

E; The degree to which technology, economic conditions or other factors have changed in the subject area affected by the existing rule, since the agency adopted

the rule? With the advancements in Aquaculture, innovative systems allow raising fish completely indoors. These closed systems offer the bio security and water conservation that is important for both people and fish in Oregon. With increasing demand and the likelihood of more droughts in the future it's important to find ways to conserve water while maintaining an abundant safe supply of fish Aquaculture in closed recirculating systems meets these goals with no adverse impact on the environment. Research has shown that barramundi is one of the best species to accomplish goal.

(3) In evaluating a request to classify a species, subspecies or hybrid the commission may consider the following factors, when appropriate:

(a) Potential to introduce disease or parasites to native wildlife populations;

"Criterion 3: Risk of Disease and Parasite Transfer to Wild Stocks3
According to Blazer and LaPatra (2002), "intensive fish culture, particularly of non-native species, can and has been involved in the introduction and/or amplification of pathogens and disease in wild populations." In recent years, increasingly more concern has been raised over the spread of disease and parasites from aquaculture to wild fish populations, with the spread of parasitic sea lice from marine salmon farms to wild salmon gaining the most attention as of late (Krkosek et al. 2005; Weber 2003; Paone 2000; Carr and Whoriskey 2004). Like the issue of escapes, the risk of the spread of disease appears to be dependent on the type of aquaculture system used, with open systems carrying the greatest risk. Blazer and LaPatra (2002) identified three types of potential interactions of cultured and wild fish populations in terms of pathogen transmission. First, the importation of exotic organisms for culture can introduce pathogens to an area. Second, movement of cultured fish, native and non-native, can introduce new pathogens or new strains of pathogens. Lastly, intensive fish culture, which can include crowding, poor living conditions, and other stressors, can lead to the amplification of pathogens that already exist in wild populations and their transmission between wild and cultured populations. Very little is known about the distribution and frequency of diseases in wild fish populations (Blazer and LaPatra 2002). Unlike aquaculture, where dead or dying fish are easily observed and diagnosed, sick fish in the wild often go unnoticed since they likely become easy prey for predators. Without the background knowledge of what diseases exist pre-aquaculture, it is difficult to determine whether aquaculture is responsible for introducing or transferring a disease to wild populations. Additionally, as with exotic species introduction, there are other means of disease introduction besides aquaculture, including ballast water transfer, fish processing, and fish transport.
Closed and semi-closed aquaculture systems have the lowest potential for releasing pathogens into the environment (Blazer and LaPatra 2002). Wastewater from these systems can be treated, and intermediate hosts and carriers (for example birds, snails, and worms) can be excluded from the culture facility. Pond and flow-through systems, on the other hand, pose some risk in terms of pathogen transfer to wild populations of fish, as both systems can spread diseases through discharges of wastewater and escapes of farmed fish. Additionally, these systems are sometimes open to intermediate hosts (such

as birds), which can potentially transport pathogens from one farm to another and between farms and the wild.

Diseases of farmed barramundi Like other cultured animals, barramundi is subject to a host of bacterial, fungal, viral and parasitic diseases usually associated with some sort of stress, such as extremes of temperature, low dissolved oxygen, poor nutrition, or poor handling of the fish. Bacterial infection is the most common cause of disease in barramundi aquaculture (Barlow 1997).

Many diseases affect juvenile barramundi during their rearing stages. Columnaris disease is common in small fingerlings held in water below about 25 oC (Barlow 1997). Viral diseases, such as the picornalike virus, have also been reported and can cause devastating hatchery losses. 3 Parts of this section have been adapted from O'Neil 2006 (http://www.mbayaq.org/cr/cr_seafoodwatch/content/media/MBA_SeafoodWatch_FarmedTroutReport.pdf).

Concerns that the picornalike virus can be transferred to other native fish have led to the current stringent controls on barramundi farming (Battaglene and Fielder 1997; ANON 1999; Stickney 2000).

The rapid expansion of open net cage culture in Southeast Asia has resulted in several concerns including infectious diseases (Leong 1992; Tendencia 2002). The bacterium Vibrio harveyi, is widely distributed in the marine environment in the region and is an opportunistic pathogen that infects fish when they are stressed and has been reported in cage cultured barramundi (Tendencia 2002). The expansion and concentration of fish farms have also caused severe problems resulting from parasitic infections in Southeast Asia (Leong 1997). Although parasites often occur in small numbers on barramundi farms, outbreaks are uncommon; though when they do occur they must be rapidly assessed and treated if large losses are to be avoided. The most common parasitic disease is white spot in broodstock held in salt water. It is caused by Crypotocaryon irritans (Barlow 1997).

Deveney et al. (2001) reported the first outbreak of another parasite, Neobenedenia melleni, which occurred on barramundi cultivated in northern Australia. The outbreak resulted in the loss of 200,000 fish and had not been previously documented in either wild or farmed species. The authors suggest that the disease was from the wild and their study serves as an example of farm amplification of a native parasite.

The most important bacterial species affecting the culture of barramundi throughout the tropics in Australia is streptococcus iniae. The bacterium can cause losses between 8-15% of production per year (although 1% is more common) and has resulted in losses up to 70% of production (Bromage et al. 1999). This bacterium has grown to be a major limiting agent in the successful culture of a variety of temperate-water fish species (Bromage et al. 1999; Bromage and Owens 2002). In Australia, autogenous vaccines for S. iniae are now available and being used by major farms.

The biggest theoretical risk to wild fish from farmed barramundi would be the nodavirus (viral encephalopathy and retinopathy), which effects their nervous system and spinal

cord. Little information exists on the prevalence of the nodavirus in wild populations, however, making it difficult to assess this risk (ANON 1999; Jones pers. comm.).
The use of closed recirculating systems (Australia, U.S.) does not eliminate disease problems and in fact may exacerbate disease problems for farmed barramundi due to water management problems. However, as long as the effluent is appropriately treated (e.g., ozonation, etc.), closed recirculating systems do eliminate the potential transfer or amplification of disease or parasites to wild stocks. U.S. based operations discharge very little effluent to the external environment. Effluent that is discharged is treated with ozone, which has been found to be highly effective in eliminating bacteria and pathogens of carnivorous fish like salmon (Timmons 2002).
Synthesis Closed containment systems in the U.S. and Australia carry extremely low risks of transferring and amplifying natural diseases and parasites to wild fish, as they are able to disinfect their wastewater with the use of ozonation. Based on this information, closed recirculating
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barramundi farms rank as a low conservation concern based on Seafood Watch® criteria for risk of disease transfer.
As is the case with escapes, open net systems, on the other hand, have a long history of amplifying and transferring natural parasites to wild hosts. Research from Southeast Asia suggests that intensive culture has led to serious concerns over disease since its inception. Farming native species creates scenarios whereby natural parasites and diseases are easily amplified and possibly transferred to wild species migrating in adjacent waters.
Although there is no direct evidence that barramundi farms are transferring disease or parasites to wild fish, there is some evidence that disease and parasite amplification is occurring on barramundi farms. Therefore, open net pen barramundi farms rank as a high conservation concern based on Seafood Watch® criteria for risk of disease transfer."
(Peet) 2006

(b) Potential for interbreeding or hybridizing with native wildlife;

Barramundi are not found in the wild in North America so this question needs to be addressed in their native waters. The primary concern would be hybridized Barramundi that could survive in colder waters. Barramundi is only found in the tropical areas of the Indo-Pacfic. Research suggests that barramundi have low genetic differentiation, have high levels of gene flow between populations, and show little evidence of adaptation or "out breeding depression" in Australia (Keenan 2000). However, Marshall and Gill (2005) recently found evidence that barramundi populations may have been substantially isolated over long periods of time and may represent independently-evolving populations, which has implications for fisheries management and potential aquaculture introductions. Given the history of escape concerns with open net pens, the direct evidence of the impact of escaped salmon on wild populations, and the uncertainty surrounding the potential impacts of interactions between escaped and wild barramundi, Seafood Watch® employs the precautionary principle for assessing the risk of escaped barramundi to wild stocks in Australia and Southeast Asia. Since all barramundi share the same tropical environment any hybridizing would not change their ability to survive in colder waters. The same holds true for salmon and any hybridizing would not change their ability to survive in warm waters. The risk is very low that barramundi could adapt to cold water.

(c) Possible competition with native wildlife for habitat, food, water, etc;

Production utilizing closed systems in cold climates provides a high degree of safety against escape, as barramundi stop feeding below 20 oC (69 oF) and death occurs below 13 oC (58 oF) (Tucker et al. 2002).

Seaside in northern Oregon has the warmest ocean of all the places measured on the Oregon coast during summer, despite temperature readings taken there in exposed water. The unusually high temperature is due to the influence of the Columbia River, which empties into the ocean a short distance to the north.

Just around the corner, along the river mouth at Astoria, the water in summer gets even warmer. The river temperature near Astoria peaks at 68 °F (20 °C) in early August, many degrees higher than the ocean.

Only the hardiest will want to stick more than their bare toe in the ocean off any Pacific beach in Oregon. The water throughout the year stays too cold for swimming without a wetsuit.

Average ocean temperature in °F

	Port Orford	Charleston	Newport	Seaside
January	50	50	49	49
February	50	50	50	49
March	50	51	50	50
April	50	52	50	51
May	51	53	52	54
June	51	55	55	58
July	51	55	55	58
August	52	55	55	58
September	53	55	56	58
October	52	53	54	55

November	52	53	53	53
December	51	50	52	51
Annual	51	53	53	54

Survival off the Oregon coast would only be possible in the area described above for a . couple months at most. Since it would stop feeding at these temperatures competition for food and habitat would be very low.

In the (USGS listed) fresh water rivers in Oregon survival and active feeding can occur in peak summertime temperatures in many of the waters listed. If a fisherman was able to get hold of a few live barramundi and release them in his favorite lake or river thinking he's going to have this fish grow and multiply because he likes them is going to be disappointed for two reasons, 1. Using the current temperatures on 3/15/2014 in all the (USGS listed) rivers in Oregon the warmest one shown is Pine Creek near Clarno at 13oC, while much colder temperatures are found December thru February. Barramundi stop feeding at 20oC and death occurs below 13oC (Tucker et al. 2002) 2. Breeding cycle of barramundi is very complex and can only happen in salt water. Since the ocean temperature as noted above would result in death the risk of expanding the population outside of the direct release numbers would not even be possible. The impact on native wildlife for habitat and food in the event of an accidental or illegal release would vary depending on the size and quantity of the barramundi released. Given the economic value of barramundi as a human food source, the likely hood of say a producer getting out of the business and mass dumping his fish in a near by river would be low. If the barramundi were not of economic size to sell to market they would still have economic value to other producers. The cost to purchase fingerlings is $.50 a piece and up depending on size. Even if one decided to ignore the economic benefit and release them anyway the impact on native fish would be localized and limited to a short period of time for all the reasons noted above. Released in waters that trout can survive in would have an even lower impact and a shorter duration. This same criteria would apply to say propagation facility located on a flood plane which flooded. While the best and safest coarse would be to never permit a facility on a flood plan or close to a river.

"Criterion 4: Risk of Pollution and Habitat Effects4
Pollution from fish farming facilities is a concern as waste products from aquaculture have the potential to impact the surrounding environment (Gowen et al. 1990; Costa-Pierce 1996; Beveridge 1996). Like other forms of agriculture, aquaculture creates waste that can be released into the environment; however, wastes from some types of aquaculture systems are released untreated directly into nearby bodies of water. Pollution from aquaculture can take several forms, including nutrients, suspended solids, and chemicals. In recent years, biological pollution, including the release of farmed fish and diseases into the wild (addressed in other sections of this report), has become recognized as an aspect of waste discharge (Byrd 2003).
The potential for impact from aquaculture waste largely depends on the type of system used (Costa-Pierce 1996). Intensive systems, especially those that are open to natural bodies of water (i.e., open net pens), represent the greatest potential for polluting the

environment, while there is little potential impact from closed or semi-closed systems, in which discharges are infrequent and wastes can be treated and disposed of (Costa-Pierce 1996). High volumes of effluent are discharged from flow-through aquaculture facilities but the effluent typically contains low concentrations of pollutants (EPA 2002). The quality of effluents leaving flow-through facilities can also vary widely depending on the activity that is taking place. During times of cleaning or other activities waste levels can be higher than under normal conditions. Most aquaculture waste is the result of excretion or excess feed (Beveridge 1996). The Environmental Protection Agency (EPA) lists several pollutants of concern from aquaculture facilities, including sediments and solids, nutrients, organic compounds and biological oxygen demand, and metals (EPA 2002).

4Parts of this section have been adapted from O'Neil 2006 (http://www.mbayaq.org/cr/cr_seafoodwatch/content/media/MBA_SeafoodWatch_FarmedTroutReport.pdf).

Wastes from barramundi farms Pollution and habitat impacts associated with marine finfish cage aquaculture derive mainly from nutrient inputs from uneaten fish feed and fish wastes. For example, a salmon farm of 200,000 fish releases an amount of nitrogen, phosphorus, and fecal matter roughly equivalent to the waste from cities ranging from 20,000 – 65,000 people in size (Hardy 2000). Studies carried out in Hong Kong indicate that 85 percent of phosphorus, 80–88 percent of carbon, and 52–95 percent of nitrogen inputs to open net cages may be lost through uneaten food and fecal wastes (FIRI 2006). In severe cases, this "self pollution" can lead to cage farms exceeding the capacity of the local environment to assimilate wastes and provide inputs such as dissolved oxygen, which in turn can contribute to fish disease outbreaks.

In tropical regions of Southeast Asia and Australia, where the growth of open net cage culture is the most rapid, the impacts of fish cages on coastal water quality and planktonic processes is virtually unknown (DeSilva 1998; Alongi et al. 2003). One study in Malaysia has found increased concentrations of dissolved inorganic and particulate nutrients around barramundi farms (Alongi et al. 2003), but no significant impacts on local ecosystem processes. It has been suggested that the lack of impacts observed may be due to differences between tropical and temperate systems, as bacterial turnover under tropical conditions may be several orders of magnitude above that seen in temperate systems (Glencross pers. comm.). Although no direct evidence of pollution or habitat impacts from open net barramundi farms was available for this report, there is a vast body of literature documenting for other species, such as farmed salmon, how open net pens contribute to pollution and alter local habitats. Open net barramundi farms may have similar effects, with the degree of effect depending on management, feed inputs (e.g., the use of trash fish results in high waste loading), farm siting (current flows, etc.), and culture density. Seafood Watch® will continue to monitor data on the effects of open net barramundi farms on the local environment.

The use of closed recirculating systems enables very high levels of water re-use; in some cases, these systems discharge less than 1% of the water required by conventional intensive aquaculture methods per unit fish produced (Australis BMP 2004). In the U.S. and Australia, closed recirculation facilities also treat effluent water substantially before discharge. Recent information from the U.S. operation demonstrates discharges containing levels of Biological Oxygen Demand (BOD) and Total Suspended Solids (TSS) greatly below regulated levels. In some cases, the effluent from recirculating systems can also be used for other purposes, such as agriculture. In addition, closed systems often occur in developed areas and thus do not impact areas of high ecological sensitivity. The potential for significant pollution or habitat effects is very low for closed recirculating systems.

Synthesis The high re-use of water, low discharges, and effective effluent treatment in closed recirculating systems result in a very low chance of potential pollution and habitat impacts from farming barramundi in the U.S. and Australia. Therefore, as it is currently practiced farming barramundi in closed systems in the U.S. and Australia ranks as a low conservation concern for the nutrient pollution and habitat impacts criterion.

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The lack of assessment of the impacts of open net barramundi farms on the surrounding environment and the vast amount of literature available documenting the negative effects of other species cultured in open systems is cause for concern. The risk of pollution and habitat effects from barramundi farmed in open net pens ranks as a moderate conservation concern based on Seafood Watch® criteria." (Peet) 2006

(d) Impacts on the habits of native wildlife;

While the risks are very low in closed recirculating systems run by responsible operations in appropriate areas, worst case scenarios should also be addressed. The science shows that risks in salt water environments as noted in (C) would have almost no impact on other species. In fresh water environments there could be some impact in the short term depending on the numbers and sizes that were released and most importantly the water temperatures. In the colder bodies of water the impact would very low if any. Waters during the summer in certain rivers can generate temperatures where barramundi could have an impact on the various native minnows in a localized area they were released in. Again as noted in (C) above once the temperatures start dropping in early fall all the (USGS listed) rivers reach temperatures where survival of barramundi is not possible. As temperatures cool barramundi would stop feeding well before death.

"Criterion 2: Risk of Escaped Fish to Wild Stocks2

Aquaculture has become one of the leading vectors of exotic species introduction (Carlton 1992; Carlton 2001), and concerns have been raised about the ecological impacts of escapes of farmed fish into the wild (Volpe et al. 2000; Weber 2003; Youngson et al. 2001; Naylor et al. 2001). Most criticism has been directed at open aquaculture systems, primarily open net pens and cages used in coastal waters, especially those used to farm Atlantic salmon. Myrick (2002) described six potential negative impacts of escaped farmed fish: genetic impacts, disease impacts, competition, predation, habitat alteration, and colonization. Escaped farmed fish can negatively impact the environment and wild populations of fish whether they are native or exotic to the area

2 Parts of this section have been adapted from O'Neil 2006

(http://www.mbayaq.org/cr/cr_seafoodwatch/content/media/MBA_SeafoodWatch_FarmedTroutReport.pdf).

in which they are farmed, and the probability of significant ecological impact increases as the number of escaped individuals increases (Myrick 2002). Different aquaculture systems carry different levels of inherent risk of escapes, with open systems (such as net pen salmon farms) carrying the greatest risk and systems that are more closed having lower risk. The risks of impact to the environment from escaped farmed organisms can be reduced through proactive measures such as careful selection of sites, species, and systems; training of personnel; and development of contingency plans and monitoring systems (Myrick 2002).

Farmed barramundi escapes The frequency and impact of barramundi escapes is dependent on the type of production facility and whether or not the production system is located within the native habitat of barramundi. Escapes from closed production systems are unlikely if multi-staged barriers are employed to stop fish from escaping from culture tanks. Production utilizing closed systems in cold climates provides a high degree of safety against escape, as barramundi stop feeding below 20 oC (69 oF) and death occurs below 13 oC (58 oF) (Tucker et al. 2002). In addition, barramundi larvae and eggs cannot survive in freshwater. Therefore, even if escapes were to occur from closed containment sites in the U.S. it would not be possible for barramundi to survive because of the low temperatures and lack of suitable habitat.

When barramundi culture began in the mid 1980s in Australia, the goal was to develop a farming industry and supply fingerlings for enhancement of recreational fisheries in lakes and rivers in the tropical regions of the country (Barlow et al. 1996). Stock enhancement to help mitigate the apparent decline in Australian recreational barramundi fisheries has received wide support in Australia. The first attempt at stock enhancement was in 1985 in Queensland and has continued until the present time. Approximately one million barramundi are stocked per year in Australia, mostly in Queensland (Tucker et al. 2002). Fish used for enhancement are required to be from indigenous gene pools and it is important to note that there are more hatchery introductions of barramundi than aquaculture escapees into Australia's coastal waters.

Substantial population differentiation has been found across barramundi's natural range in Australia (Doupe et al. 1999). Research in Queensland and the Northern Territory has identified at least 14 genetically distinct stocks of barramundi in various major river systems, which it has been suggested is the result of long-term reproductive isolation between barramundi in the different regions (Shaklee et al. 1993; Salini and Shaklee 1988). Given this genetic diversity, researchers have suggested that aquaculture escapes may pose significant threats because wild and cultured barramundi are likely to interbreed freely (Shaklee et al. 1993; Cross 2000). A similar situation exists with escaped farmed salmon, which have been documented to have negative effects on wild salmon through breeding (Krueger and May 1991; Youngson and Verspoor 1998; Fleming et al. 2000; Einum and Fleming 1997; Einum and Fleming 2001) and through competitive interactions with other native salmonids (Jacobsen et al. 2001; Volpe and Anholt 1999; Volpe et al. 2000; Volpe et al. 2001). Doupe and Lymbery (1999) found evidence that suggested barramundi were escaping from local lake-based barramundi farms and were interacting with wild populations in Western Australia.

In early 2006, thousands of barramundi escaped from open net pen farms in northern Australia when extreme tides broke open cages (Francis 2006). Escapes of cultured fish are known to

occur frequently with the use of open systems due to the effects of weather events or the effects of predator interactions (e.g., sharks, crocodiles, dolphins, puffer fish, and turtles), which can make holes in the nets allowing fish to escape (Barlow 1997). Australia has been taking steps to rectify this problem with the use of steel nets (Glencross pers. comm.).

Synthesis Escapes of farmed barramundi from closed recirculating systems are highly unlikely due to a lack of connection to local waters, the use of multi-staged barriers that prevent escapes, and the presence of unsuitable temperatures and habitat in the surrounding environment, which would prevent survival of any escaped fish. Closed recirculating barramundi farms thus rank as a low conservation concern for the risk of escaped fish criterion.

Open net pens or cages, on the other hand, have a long history of concerns with escapes due to their use by the salmon aquaculture industry. Barramundi are farmed in open net pens in their native habitats in northern Australia, Southeast Asia (Indonesia and Singapore), and Taiwan. Research from Australia suggests that genetic differentiation may be an important factor in the biology of barramundi and that potential interbreeding between escaped barramundi and wild barramundi may affect this diversity. Research has found that escaped barramundi are interacting with wild barramundi, although the consequences of these interactions have not yet been quantified.

Although no information is available regarding escapes from open net farms in Southeast Asia and Taiwan, an "experimental" farm in Australia has had two major escapes due to weather events. Given these escapes and the risks posed to the genetic diversity of wild barramundi, open net pen barramundi farms rank as a high conservation concern for this criterion." (Peet) 2006

(e) Potential predation on native wildlife;

In warmer summertime waters barramundi could prey on any fish or crustacean of a size it could consume. A lot would depend on the size and quantity of the barramundi that escaped along with water temperatures. If small enough they could become prey themselves.

(f) Feasibility and cost of capturing or eradicating escaped animals; or

Since breeding is not possible as outlined above and some did escape into waters with warmer summertime conditions that are favorable for survival, the fish could most likely be caught using traditional fishing methods because they are a sport fish in their native waters. As noted in (C) above barramundi would not be able to survive in the cold ocean temperatures or any of the (USGS listed) rivers over the late fall to early spring. There would be no long term impact only very short term in a worse case scenario.

(g) Any other factor or consideration the commission considers necessary to protect and maintain native wildlife.

The most important thing would be the rules under which they allowed to be raised. I believe no matter how low the risk is to native fish everything reasonable must be done to further lower the risks. All operations should be indoors in bio-secure buildings with some type of security system. Only closed recirculating systems should be allowed. They shouldn't be allowed near rivers or flood plains. Transportation of any live fish to market should only be done by the operator. Detailed records showing the number of fish sold, to whom and dates would be beneficial for both the producer and ODFW. Being able to work closely with ODFW to ensure the best information is available to both parties to help make fish propagation a safe and economically important business in Oregon. All Oregonians and their native fish will benefit from this.

By____________________ 3-15-14

Robert Camel
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V. References

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