Activity 20: Living Research: Aquatic Heroes and Heroines - Aquatic WILD-

Age:

Grades 7-12

Time:

One or two class periods 60 minutes each

State Essential Learning Requirements

Reading: All of 2, 3.1, 3.2

Writing: All of 1, 2.1, 2.2, 2.3, All of 3.

Communication: All of 1, 2 and 3.

History: All of 2, 3.

Geography: 3.1, 3.2

Materials:

Aquatic WILD Activity provided: You need writing materials.

Overview:

Students identify people who have made contributions to conserving and preserving aquatic environments; research their contribution, if possible interview them, and write a biography.

Washington adaptation provided:

- Biographies of WDFW Fisheries scientists provided and also available at the WDFW website.

  Http://www.wa.gov/wdfw/pubaffrs/1stpersn/

- Otolith research conducted by Dr. Schroder and team. (Activity -10)
- Scale research conducted by John Sneva and team. (Activity Packet-11)
- WILD Salmonid research by Dave Seiler. (Aquatic WILD - Deadly Waters, Activity 19)

Objectives:

- To create biographies of local fish biologists.
- To develop a report for your community on fish research and management in your area.

Critical Questions Addressed:

3. Recovery. What science and which scientists are involved in WDFW's efforts to recover *salmon.*

Directions:

- Find out what research is being conducted on salmon where you live.
- Call the Fish Biologists at the WDFW Regional offices for more information on research and to request biographies

Regional Office phone numbers:

WDFW Regional Offices

Region 1 – Spokane – 509-625-5347

Region 2 – Ephrata – 509-754-4624

Region 3 – Yakima – 509-457-9320

Region 4 – Mill Creek – 425-775-1311, Ext. 117

Region 5 – Vancouver – 360-906-6701

Region 6 – Montesano – 360-249-1219

Extensions:

- Share your information and biographies with the local archive, school archive and WDFW Regional Office.
- Create an "Annual Fish Management" profile in your area to keep track of research and successes in fish management each year.

LIVING RESEARCH: AQUATIC HEROES AND HEROINES

OBJECTIVES

Students will describe the importance of the accomplishments of local people who have contributed to conserving or preserving aquatic environments.

METHOD

Students identify people—through news media, current events or other means—who have made contributions to conserving or preserving aquatic environments; research their contributions, including by interviewing them; and write a biography.

BACKGROUND

Students are frequently called upon to write research reports about people who are world famous or who have attracted a lot of attention in major media. This can give students the impression that these sorts of active, committed people are always far away from them and that there is no one of accomplishment in their own communities. Yet, all around us, there are people who work tirelessly, year after year, to contribute to the quality of life in their communities. Some of these people focus on issues involving wildlife and the natural environment. Some of these people are employed by state or local governments. Some are in business and industry. Others work through conservation and wildlife organizations. Many are simply interested and dedicated private citizens, volunteering their time to work on issues of concern. These people may not be famous. They may not have attracted the attention of the media. Often, in fact, they may shy away from such attention. This activity calls upon students to develop their knowledge and appreciation of the efforts of these often unrecognized contributors to their own communities, celebrating the exercise of responsible environmental citizenship. The students will develop an increased understanding of some of the character attributes required of an effective environmental citizen leader; and reinforce within themselves the idea that they too are capable of making a difference on behalf of wildlife and the environment.

Efficacy is a word used in political science when talking about whether or not people think they can make a difference. Do you think if you try very hard to do something that you probably can succeed? If so, you feel a sense of efficacy. People who believe they can

Age: Grades 7-12
Subjects: Social Studies, Language Arts
Skills: communication, description, interpretation, interview, listening, public speaking, reading, reporting, research, small group work, synthesis, writing
Duration: several class periods of 30 to 60 minutes each
Group Size: groups of three or four students each
Setting: indoors and in the community conducting interviews
Conceptual Framework Reference: VII.A., VII.A.1., VII.A.2., VII.A.3., VII.A.4., VII.B., VII.B.1., VII.B.2., VII.B.3., VII.B.4., VII.B.5., VII.B.6., VII.B.7., V.A.5., V.B., V.B.1., I.D.
Key Vocabulary: efficacy, citizenship, heroes, heroines
Appendices: Local Resources, Interview

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make a difference feel a sense of efficacy.

Sometimes it is the scale of things that determines whether or not we think we can make a difference. We are likely to think we can make a change in our own lives—pick some different friends, learn something new, change a hairstyle. We are probably a lot less likely to think we as individuals can successfully organize a campaign to significantly reduce the national debt.

Some people, somehow, do make a significant difference—not just in their own lives. Most people who accomplish things of significance do feel a sense of efficacy—although they probably do not call it that. They feel or see something they care about, and they work to accomplish something. Most of these people are not well known public figures. Some can be found in your own community. This activity is designed to find some of those people.

Different from many typical biographical research problems, the people who are the objects of this research are not likely to be well known—at least not in major media at national and international levels. Their names are not likely to be found in *Who's Who* or in encyclopedias. Some may be members of local chapters or groups affiliated with national organizations. Others may be involved with purely local groups like natural history clubs, botanical organizations, bird watching societies, wildlife organizations, or outdoor recreation groups. Others may choose to have no organizational affiliations whatsoever. Still others may be people whose employment entails a day-to-day focus on environmental conservation and protection. There are many such people working in government agencies at many levels, in academia, in private organizations, in business and in industry. Students will have to develop what may be new research strategies and skills in order to undertake this activity. In a sense, they become investigative reporters seeking a local story, using whatever local resources are available—including first-hand interviews and direct contact with people as sources of information. This requires sensitivity and skill on the part of students and teachers. You may find it helpful to refer to the appendices in this activity guide for additional suggestions in the section, "Getting the Most from Local Resources."

The major purpose of this activity is to have students identify and appreciate people in their own communities who have made, or are making, a significant contribution to the conservation and protection of wildlife and environmental quality—especially in aquatic environments.

MATERIALS

writing materials; envelopes; postage; telephone
OPTIONAL: tape recorder; videorecorder; camera; film; darkroom

PROCEDURE

1. Introduce the activity by explaining its purposes with emphasis on the fact that the students will be doing some first hand biographical research on people in their own community—local heroes and heroines.
2. Brainstorm either as an entire class, or in small groups, the possible sources of information which could be used to find out about people in the community who have contributed to conserving or preserving aquatic environments. Examples might include: public library and librarians, school library, city hall, government offices, the telephone book, local newspapers and magazines, reporters or editors on the staff of local papers, local television news directors, the presi-

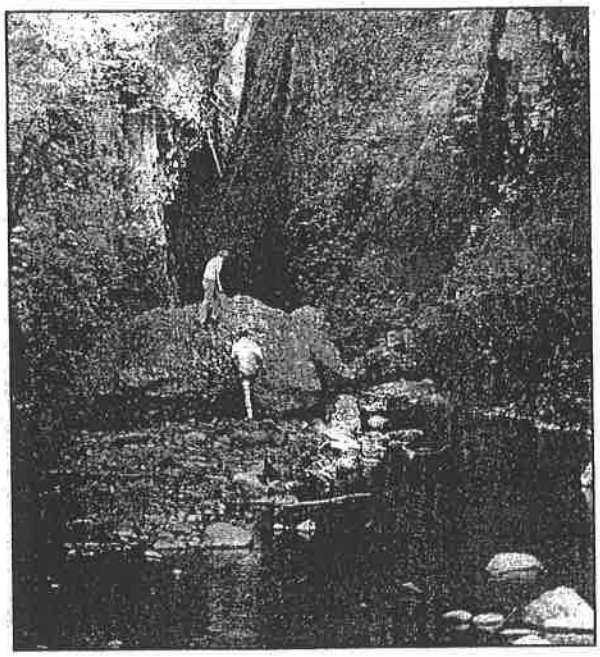
dents or executive members of local groups or clubs. The class might even place an advertisement in the paper, or enlist the aid of a reporter to write up a story on the class project.

3. Once a list of names has been compiled, students in groups of three or four should draw a name at random from the list. Each group will now become a biographical research team to prepare a biography or living history of the person. In some cases the suggested name may be that of a person who was important in the community as a conservationist, but who is now deceased. In these cases, the team will have to identify relatives, friends, former employers and other potential sources of second hand information to interview.

4. Each team should develop a research plan. This should include the outline of any interviews they may want to conduct, whether with the person directly, or with others who know or knew them. Each team's plan should be discussed with the class and suggestions for improvement considered. After the plans have been discussed and refined, the teams should make contact with the people they want to meet and interview. This should be done using a letter, stating the purposes of their research and suggesting that they will follow the letter with a personal contact by telephone.

5. Once the teams have confirmed the willingness of the people to be interviewed, they should meet with them and conduct the interviews. The basic format for the interview should include any personal history details of note but the major questions to be addressed might include:

- How did you become interested in the aquatic environment?
- What prompted you to take action?
- How did you decide on the course of the action you took?
- What difficulties did you encounter and how did you overcome them?
- What do you think your contribution has been?
- What are your personal dreams and goals for aquatic habitats?
- What would your advice be to citizens wanting to take positive action to improve the aquatic environment?



The list of questions could be modified to include personal interests of the students and to reflect particular circumstances.

6. Once the interviews are complete, as well as any additional research, each team should write a biography about their person. Once completed, ask each of the teams to give a brief oral report to the rest of their classmates. Make copies of the biographies and send each biography with a letter of thanks to the people who were interviewed and others who assisted. It is recommended that letters of thanks be sent to all who assisted in the process.

7. OPTIONAL: Create a visual display of all the com-

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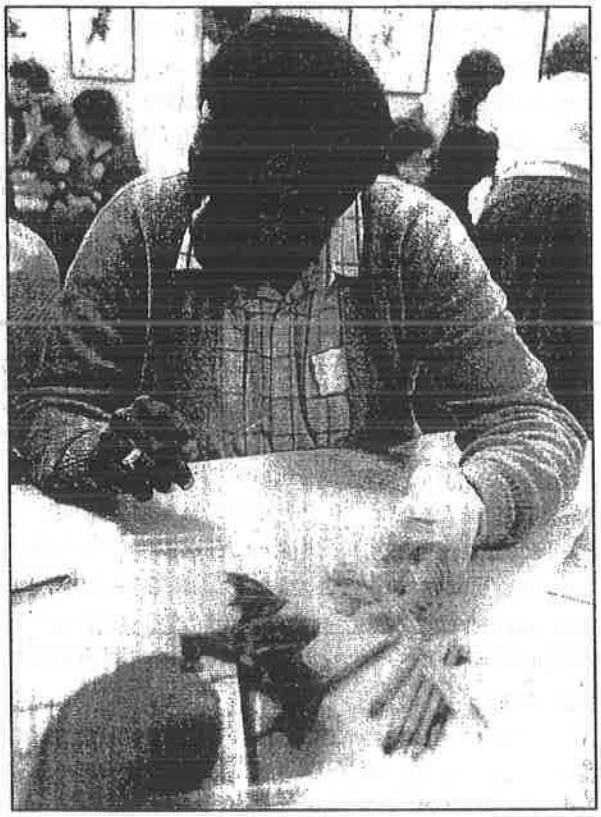
pleted biographies, complete with photographs and news clippings. Invite the local aquatic heroes and heroines to the school for a public recognition of their contributions. They could be given letters of thanks and copies of their biographies at this time. The news media could be invited, including local television, radio and newspaper reporters.

EXTENSIONS

1. Form a group in the school to address problems related to the conservation and protection of aquatic resources and habitat. What have you learned from the biographical research that can assist the group to formulate some action plans?
2. View films or use other media presentations to find out about some of the well known aquatic conservationists. Included might be Rachel Carson, Jacques Cousteau, Jean-Michel Cousteau, "Ding" Darling, William Beebe, Gilbert White and David Brower.
3. Develop a computer database of the people from your community who were identified in your study, including the information you discovered and the names of local contact people who assisted in the study. This might be a valuable source of information for others, and could be updated.
4. Present a copy of the biographical reports to the school library and/or the public library to include in their collection. These may be important contributions to local history.

EVALUATION

1. Name two people who have helped protect a local aquatic area and describe what each did. Why are their actions important?
2. What can you do—working alone or with others—to conserve or protect an area of aquatic habitat in your community?



Living Research: Aquatic Heroes and Heroines - Aquatic WILD
Student Worksheet-

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WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

First Person

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An Interview with John Weinheimer,

Region 5 Inland Fish Coordinator

I've been with the agency for 17 years. I graduated from Western Washington University in 1980 with a bachelor of science in biology. I'm married, my wife's name is Delia. We have three daughters, Emily, Caroline and Alice. We live in Carson which is in the Columbia River Gorge in Skamania County. We've lived there since 1985. I worked as an area fish biologist for the former state Department of Wildlife starting in 1987. I then moved into a district fish biologist position with the Department of Fish and Wildlife in Region 5 (the Vancouver area). I am in charge of the Inland Fish Program for Region 5.

Q: **WDFW plants millions of trout every year. What is the goal? What's the department trying to do?**

A: The goal is to try and provide as much family recreation as we can with our trout program. In it, we rely pretty heavily on that put-and-take fishery. It enables us to put fish out in local areas and provide fishing for a lot of heavy pressure. But it is a fishery that is close to many peoples' homes. It's in peoples' back yards or in their downtown public parks. Another important thing about planting catchable-sized trout, in the 9-inch range, in lowland lakes is that fishers don't have to invest a lot of money to participate. And you don't have to invest a lot of time. Here in western Washington you have a lot of real fine trout fishing opportunity without having to make the commitment to take an entire weekend or perhaps a weeks worth of vacation to go do it. And, if you're enjoying yourself, you have the opportunity to go back during the week or perhaps another weekend.

Q: **You mentioned lowland lakes. Are they the only places WDFW trout are planted?**

A: No, I can't speak for the entire state but I can speak for Region 5 in terms of our trout fishing opportunities. We are really, really diverse in terms of what we do with our hatchery program and what we do with wild production. We've got our lowland lake program. We've got reservoirs in which we plant fish and we've got high lakes, meaning lakes that you have to hike to, such as in wilderness areas, or high mountain lakes to which anglers can drive for a lot of recreational opportunity. Trout are planted all over the place. And that means a lot of diverse opportunity with a lot

of different types of regulations of which anglers must be aware.

Q: **Some of those plantings are fairly unique aren't they? They use airplanes and people hike them up?**

A: In order to do our trout program we use a variety of methods for planting fish. We rely on volunteers. There are lots of clubs and organizations that help us do our plants. Everything from groups that are committed to planting high lakes to horse groups, to Boy Scout troops. We also do a lot of our plants by helicopter and by airplane to get fish into high mountain lakes.

Q: **How do you decide which lakes to plant? And which lakes get the catchables and which lakes get the fry?**

A: It's the monitoring that we do that determines on what kind of fish program we're going to do in a lake. We do biological sampling, creel censuses, ask volunteers to keep and turn in diaries of what they catch and things like that. We'll go in and look and see what we planted in a lake, what kind of survival we've gotten from the plants. See what's working and what's not working. And then make changes based on what we have available. The amount of available money also determines whether fish will be planted as fingerlings or raised to catchable size.

Q: **In other words, if you put them in lake as a fingerling you've saved a lot of money because you haven't raised them as long?**

A: That's correct, you're using the ability of the lake to grow the fish when you can. But a lot of our waters contain other species of fish, some of which aren't very desirable when you are trying to manage a trout-only water. Species such as bass and bluegill can out-compete a fry or a fingerling trout in which case we have to go to a catchable trout program in order to have fish for people to catch.

Q: **You yourself call it a put-and-take operation. Is that the case, that WDFW trout that are put into a lake or reservoir are taken as fast as they planted? Or do some learn to be fairly tough to catch?**

A: I would tell you that when we plant fish that are of a catchable size most of the time what we are doing is trying to provide fish to be caught that same season and at a very high catch rate. However, when planting fry and fingerling trout into a water more often than not we're hoping those fish will carryover a couple years and provide years of recreation. So it depends on the circumstances in terms of what we're trying to get out of those fish.

Q: **A hatchery raised trout can be good target of a fairly sophisticated angler, can't it?**

A: That's correct. We can manage a lake for that kind of fishing. For instance, take some of the brown trout that we plant out as catchables. After one of those fish has been caught and released, it can be extremely difficult to catch again. Just ask any angler about that. Those brown trout can grow to a terrific size. They can survive well and last for years. Mineral Lake in Cowlitz County would be an example of that. It's an extremely popular fly fishing-only water. We've got brown trout in there

that will go several pounds. Most of those fish started out at a catchable 8 - 10 inch size and it's not uncommon to catch those fish well over 18 inches.

Q: **Often in relation to planting trout you hear about the department rehabilitating lakes. What's that all about?**

A: Rehabilitating a lake means we've gone in removed the unwanted fish. Mineral Lake in Lewis County would be an example of that. Mineral Lake is probably our finest fingerling trout water in southwest Washington. It has an historically popular rainbow trout fishery for the opener and we have rehabilitated that lake, meaning we've treated it with rotenone to get rid of the unwanted fish. We don't want to manage that lake as a warmwater lake, meaning it contains bass, perch and those type of fish. Somebody will put those warmwater species in a lake and then we lose the ability to plant fingerlings and produce a good trout fishery. And so we go back in there and apply rotenone to the water and get rid of those warmwater fish and start it over. It's something that we do quite a bit in eastern Washington. We're doing it less and less in western Washington.

Q: **That's a problem for managing fisheries, particularly trout fisheries, when people decide on their own to bring in bass or northern pike, isn't it?**

A: Yes, it's really frustrating because the decision is being made by the few for everybody. One person illegally planting fish can ruin a very, very popular trout water. We try hard, I think, in the state to provide a diversity of opportunity whether it be trout or warmwater fish. We managers designate some waters for trout and others for other species and it takes only one person to cost the anglers of this state a lot of money and recreational opportunity lost.

Q: **If you put a few bass or other warmwater species into a lake pretty soon you have a whole bunch of that species?**

A: Another thing you see typically is that somebody will come in and plant a few fish out of a bucket, perhaps bluegill, bass or perch that they've caught somewhere else. More often than not those populations quickly become unbalanced. And what I mean by that is you end up with stunted fish, perhaps bass or bluegill, that are not of a desirable size for anybody who wants to catch them. And then you end up with a mess.

Q: **How does stunting occur?**

A: To get balanced populations you have to plant fish in certain numbers, at the right sizes and at the right times of year. So that perhaps a bluegill population will be the main prey base for a predator like largemouth bass. What happens is that if those numbers aren't put in at the right times and right numbers you get an explosion of bluegill that the bass can't keep up with and so you ended up with a bunch of bluegill that are of a size that nobody wants to keep.

Q: **Do trout plants threaten fish stocks protected by the Endangered Species Act?**

A: There's two points that I'd like to make in answer to that question. They can pose a risk in terms of putting them in places where they can out-compete or perhaps prey on fish that we're trying to protect. But, on the other hand, planted trout can become a prey base for wild species in trouble. For example, we plant approximately 600,000 fingerling rainbow into Swift Reservoir in Skamania County

every year. The work I've done up there since 1988 has shown me that those fingerling rainbow that we plant are a major prey for our wild bull trout that are using that reservoir. Not only are those rainbows providing a recreational opportunity for sports people but they also are providing a good diet source for those bull trout and we're working hard to get those fish recovered. It's working.

Q: **So obviously it can be good or bad, is the department is careful about putting hatchery trout into a lake where they would pose a threat to a wild salmon or trout species?**

A: That's correct. We're trying to minimize those risks and I'd like to say that the state Wild Salmonid Policy has given us some real pluses for the resident trout program. Because of the Wild Salmonid Policy, in the last couple years we have taken excess adult steelhead and sea- run cutthroat from our local hatcheries down in southwest Washington and planted them into our local lakes to supplement our catchable trout program. What that means to is that you can go down to a water like Klineline Pond in Clark County during the winter time and not know what you are going to catch: An 8- or- 10 inch trout or on up to an 18-pound steelhead. So it's worked out really well for us. We've taken advantage of a situation where we're trying to protect wild stocks but it's given us an opportunity to provide additional fishing opportunity in our lakes.

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WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

First Person

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An Interview with Chuck Baranski, Fish Biologist

Chuck Baranski is a fish biologist with the Washington Department of Fish and Wildlife. He received a fisheries degree from the University of Washington and began working for WDFW while in college in 1969. An avid angler, Baranski says his love of fishing was a major factor in his decision to make salmon stewardship a career. Chuck and his wife Jeanne have two sons, John, a junior at Linfield College, and James, a freshman at Capital High School in Olympia.

Q: **You have been responsible for developing some new fishing opportunities, tell me what they are and how they came about?**

A: Not only has that process been a positive thing for the public, but it really pointed out some of the benefits of going from a centralized type agency that we used to have back with the Department of Fisheries to regionalization. We had a problem with excess fish coming back to our salmon hatcheries. We were given the task of finding something constructive to do with the fish rather than ship them off to be converted into cat food or whatever under our surplus contract. So we got together our regional management folks, enforcement people and hatchery folks and came to some conclusions about what the possibilities were. Not all of them worked out, but some of the good things included the idea, which predominately came from the enforcement officers, that we might do something with these fish like we do with kids' fishing derbies. Put them in ponds where people have a second shot at catching them. So we put surplus coho salmon in a couple of juvenile-only ponds, DeCoursey Pond in Puyallup and Wapato Lake in the Lakewood-Steilacoom area, some in Tule Lake over in the Nisqually system, which is walk-in only, and some in Waughop Lake near Steilacoom. We didn't know if these fish were going to be particularly good for a fishery, we didn't know how well they were going to bite, but we were willing to take a chance on it. As it turned out, about 10 percent of the fish did enter into the catch and they provided thousands of days of angler opportunities - it was a real success and now it is an on-going program. There has been great public reception, demonstrated by the fact we've got people calling the hatcheries now asking, "Hey, are you going to be putting extra fish in these lakes?" They are looking forward to those opportunities, which I think is a sign of a successful program. In addition to lake plants, we also made these fish more available to various food bank outlets. We also had a cooperative venture with a church in the Tacoma area to distribute fish to needy folks in the neighborhood. Additionally,

there is a fish passage facility being put in the mainstem Puyallup River in the Electron area where Puget Sound Energy diverts water for a generation project. We took some of these surplus hatchery fish and hauled them up into this area (above the diversion) to let them spawn naturally, to give nature a jumpstart. We are going to do that for three years. It appears from the first brood that spawned up there that we got excellent survival of the fish resulting from the spawning. Hopefully, down the line those fish will adapt to the environment up there and provide a greater level of naturally produced coho in the Puyallup Basin. So there were a bunch of different things we tried to do and for the most part, we have been successful. It is a testimony to the cooperative process that went on, not being tunnel-visioned and thinking you are the only one who has a good idea.

In the past, before regionalization of the Department, my responsibilities were on almost a Puget Sound-wide basis for coho salmon, predominately stock assessment work. But with regionalization, we've been given more limited geographic areas with broad responsibilities within them. For instance, I'm pretty familiar with the anadromous salmon in my areas, but it has been kind of a stretch all of a sudden getting involved with steelhead and inland fisheries management. Maybe having a little more to do with the habitat issues there as well. With regard to steelhead, (Puyallup Hatchery Complex Manager) Darrell Mills and I sat down and were thinking the hatchery steelhead program in the Puyallup Basin had been less than successful in recent years. The past program has been to take all of the steelhead production and disperse it throughout the watershed in off-station plants.

***Q:* What do you mean by off-station?**

A: Putting the steelhead smolts in a truck and taking them to bridges in various locations throughout the basin and dumping them into the Puyallup River or tributaries as opposed to planting them, like we typically do with salmon, on-station. In other words, just opening the (hatchery) gates and letting them go. One of the concerns about having an on-station steelhead program is that perhaps the fish more readily return to the hatchery and don't mill around in the lower river, don't go into other areas where they are more available to the recreational fisher, which would be a huge concern on our part. The problem was, we had gotten to the point where recreational harvest wasn't that great in the Puyallup Basin anyway. It appeared like survivals and contributions were going steadily downhill. We thought this was an opportunity to try something different, so we have committed to planting fish on-station at Voights Creek Hatchery. An advantage of being planted at Voights Creek as opposed to the Puyallup Hatchery, which is in the lower part of the watershed, is that the fish have to move up through the Puyallup System and the Carbon River before they get to Voights Creek, which still offers a very significant recreational opportunity. Not only was survival and contribution to the recreational fishery a concern, but we were concerned with compliance with the Wild Salmonid Policy. By spreading fish all over the watershed, you are inviting those fish to spawn in the wild. There probably isn't a great concern about cross-spawning with the natural fish because the hatchery and wild fish spawn at different times. However, if there is successful hatchery stock spawning going on, the juveniles will be competing with "native" juveniles in that system and may have some negative effects in that regard. So we were trying to get the fish to come back to an area where we can get our hands on them. That allows us to do two things--first, minimize the effect we may be having on the wild stocks. Secondly, in the past, we had to import fish on an annual basis into the Puyallup System--meaning we did not have enough fish returning to the hatcheries in the Puyallup system to supply the necessary eggs. So we would end up with fish coming from the Green River system, Bogachiel or wherever there were surplus eggs for the (Puyallup) program. So what you have then is a constant influx of "foreign genes" coming into

the system. We are thinking that if we can develop an in-basin broodstock, we might be able to develop a stock of fish that is actually adapted over the long run to the Puyallup system, increasing survivals and as a result, increasing fishing opportunities. This year, 1998-99, the return is the first from a partial on-station release and the results are very encouraging. This year alone, with only 50,000 to 60,000 fish released at Voights Creek, it looks like we are going to get enough fish back for our entire Puyallup in-basin program, which is about 250,000 fish. For each succeeding group we have put the entire production, 180,000 fish, into the Voights Creek program. The fish are allowed to migrate out in their own time--it is called volitional release. There may be an advantage to that at well. Fish migrate out in bits and pieces, rather than being taken out in a truck and forcibly released--then you've got this mass of fish in one place at one time, which may or may not be supported by the environment there or may be more susceptible to predation. There is the possibility we will have increased survival on out-migration because the fish may be less concentrated as they move downstream Another concern was that it has been demonstrated in some on-station programs that a lot of the steelhead smolts may residualize, in other words they may want to stay as resident trout within the system you put them in -- just not go to sea at all. Then you end up with problems with regard to competition with resident game fish. Darrell says this last year when we had our first full scale on-station release, there was essentially no residualization in the (hatchery) pond, which means all these fish had a migratory sense to head out. There was food there in the pond, there was reason to stay if they desired to do so, but, in fact, they all moved out. We are really encouraged by that program. The proof is going to be in the pudding, of course, what kind of harvest do we get from these fish. Increased survival doesn't do us any good if we don't get any net benefit to our user groups out there. That is yet to be determined.

Q: **Is that because the adults don't come back or they are intercepted somewhere else?**

A: The main concern expressed by people more experienced in steelhead management than I am was that the fish would be more likely to move through the system quickly and up into the hatchery and not provide as much fishing opportunity. That probably wouldn't be felt so much in the tribal net fisheries but it may have an impact on the harvest by the recreational anglers. We won't be able to analyze that until we see what the catches were this year and what our catches next year look like. Preliminary indications have all been positive so far.

Q: **Why are there surplus hatchery fish available for these purposes?**

A: It's a function of the weaker natural stocks. We have hatchery fish mixed up with the natural fish throughout their life history. Up to this point in time, we haven't been able to distinguish those fish in the fishery. So, you end up having to manage for the stock that needs the greatest protection and you reduce fishing opportunity to the lowest common denominator. You have greater juvenile survival of hatchery fish compared to wild fish, because they are protected during the freshwater stage of their life history. Therefore, you don't need as many adults coming back to maintain a hatchery run of fish as you do for a natural run. So if you protect the natural run, you end up with a surplus of the hatchery fish coming back. We may be able to harvest hatchery fish at a 90 or 95 percent rate--catch 90 to 95 percent of the fish and still have sufficient fish back at the hatchery to maintain the run. There is no way a natural run can sustain that same harvest rate. If we manage everything for a 50 to 60 percent harvest rate, which protects the wild fish, then, all of a sudden, you've got that additional 40 percent of that hatchery stock showing up at the hatchery. You've got to do something with those fish.

***Q:* Won't that change with marking?**

A: That's the theory. If we can identify these fish in the fisheries, we can open up opportunities that allow us to harvest hatchery fish only. There will be some limitations on that, as well, because there will be some associated fishery mortality on the wild stocks simply because they are being handled. It isn't like we can go out and harvest every single hatchery fish because at some point in time you are going reach a level of unacceptable fishery mortality on the wild stocks, even with a selective fishery program. Obviously it is going to offer a whole lot more opportunity than we have right now without selective fisheries. If we are able to incorporate that in commercial fisheries as well, we are likely to have a very positive influence on natural returns.

***Q:* When you say 10 percent of the hatchery coho placed in lakes and ponds enter the fishery, you mean they are caught?**

A: Yes. We did some creel surveys and found two things: anglers were catching fish and the great appreciation the public has just to have an opportunity with a reasonable expectation of encountering a fish. By far and away, not everyone is catching fish and it is the same old adage, probably 90 percent of the fish are being caught by the 10 percent of the fishermen who know what they are doing. But the thing about the coho in these ponds is, they are jumping around all over the place and swimming around in schools. The people see the fish in there and it really maintains their interest level. And you see the occasional fish brought to the beach--they can be caught. It is a lot of extra work for the hatchery people to plant these fish, but they seem to receive the same satisfaction as well, seeing their product providing some recreation. I can't understate the amount of extra work that goes into this program by the hatchery folks.

***Q:* What do you mean by stock assessment work?**

A: That's really a large part of my job. Stock assessment is, essentially, inventorying spawning fish, estimating the spawning populations. I've been doing stock assessment work since 1981, primarily coho stock assessment. Since regionalization, I'm working predominately with chinook, coho and steelhead with some chum. What that boils down to is going out on to the spawning grounds and counting fish. Methodology differs by species but essentially we have specific reaches of rivers within southern Puget Sound and Hood Canal that we survey on a systematic basis--weekly or every 10 days--over the course of the spawning season. We have a very long-term data base by which we can compare these numbers to get relative indications of spawning escapement from one year to the next. In the case of chinook, chum, pink and steelhead, we're able to make absolute escapement estimates from those numbers. By that I mean we can take the counts of either fish or redds--spawning nests--and estimate actual numbers of fish that are spawning in those areas. In the case of coho, it's not that straightforward because the fish spawn everywhere. One of my peers likes to say they are like rats, they are river rats, they spawn everywhere. They require very small tributaries to spawn in. So it is impossible to go out and cover all the available spawning habitat. So you have take a look at a select number of streams and assume they are representative of what is going on in the rest of the area and extrapolate from those counts. We look at the spawning densities in those index reaches and use them to estimate total basin escapement.

***Q:* How do you make these estimates, from an airplane? By snorkling?**

A: We tend to use helicopter or fixed wing flights to do redd surveys for chinook and steelhead in some of the mainstem areas. We also do raft surveys, floating down rivers, particularly for chum, chinook and steelhead. When it really gets down to the chum, coho, chinook and steelhead work, it is a lot of walking down the river and counting fish or redds. That is the most enjoyable part of the work, just getting out and walking along the rivers. You get to see a lot of things other people just won't have the opportunity to see.

***Q:* Are you electroshocking or do you just know what to look for?**

A: It's really funny because you tell people you are out counting fish and they look at you like you are kind of screwy. How do you count fish? It is an acquired skill. I remember the first time I went out to survey with (Olympic Peninsula Region Fish Biologist) Tim Flint he asked, "What kind of fish is that over there?" And I don't see any fish. By the time we finished that survey, I thought, "I can't do this." He just laughed at me. He said you have to develop search patterns so you know what you are looking for. After a while you realize you are keying in on colors, movement and shapes --not fish-- and all of a sudden that brings your focus to the fish. And over time you learn the behavior of the animal as well. Take the coho salmon early in the season, when water levels are low and clear. The fish aren't quite ready to spawn and they are vulnerable in those small streams, so they are hiding. So you find yourself looking for a piece of a fin hanging out from under a log or something like that. And you'll go and investigate those areas where you expect to find fish holding and you'll spook them out of there. Later on, when the flows come up and they start spawning, they become more oblivious to you and they are more open and easier to survey. Surveying coho in the small tributaries, you sometimes have to survey 40 to 50 feet ahead, in order to see the fish before they see you. Once aware of your presence, they go into their little hidey holes and you will never see them. Surveying spawning fish is very enjoyable. It is the kind of thing that has kept me in the job I'm in right now -- that one-on-one relationship with the resource. I think sometimes folks move into jobs where they lose touch with the resource and then find it difficult to relate the numbers on the page to the animals they represent. Maybe you lose some degree of the passion for the resource that you had. Quite frankly, if I wasn't able to maintain that contact, I really don't know if I would still be in the business.

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An Interview with Jeff Korth,
District Fish Biologist

Jeff Korth is the district fish biologist for Grant, Adams, and part of Douglas counties, and currently is coordinating studies of fishery declines and changes in Moses Lake in the Columbia Basin. He started with the agency in 1987 doing project work in western Washington, first creel checks on the Green River, then steelhead redd surveys in the Chehalis drainage, genetic stock index work on salmon, and fish count coordination at Bonneville, Dalles, and John Day dams on the Columbia River. Originally from Wisconsin, Jeff has a bachelor's degree in wildlife management from University of Wisconsin-Stevens Point and a master's in zoology from Louisiana State University-Baton Rouge.

Q: How do you manage fish in this dry central Washington district?

A: It's primarily recreational. Grant County is the number one fished county in the state. We actually have a tremendous amount of water here. I have a lot of fun saying I'm a fish biologist in the desert. But because of the irrigation and reclamation projects, of course, Grant County has a ton of water and it was all new water when it was first formed back in the '50's and '60's. It was just like all the fields around here, when water got in there it was very fertile land, all it needed was water. It was the same for the fisheries — they were very productive for decades. By the time I got here, things were in a kind of downward slide, like a field that you just keep planting until you run out of nutrients. That's not the whole picture, of course. It's not that simple. I can't document that the lakes are running out of nutrients. It could be that the nutrients are just tied up in different ways. We certainly have many more waters with different species of fish here now than in the heyday of lake rehabilitations, but that has sort of built up. Originally it was almost all trout fisheries, except for the big bodies of water. But even by the '70's there were a lot of warmwater species, primarily spread around by the public. And so over time we started managing for warmwater species.

But we try to hold the line on trout waters, too, because we can get the most bang for our buck in trout fisheries. We can produce more days of recreation in a trout fishery in these smaller lakes than we can any other way. The main reason for that is that trout are a known quantity. They don't reproduce here in the Basin. You put X number of trout in there and after a number of years you pretty much know what the survival is, given that the lake is free of competing species. It's a lot easier to manage than a water with introduced warmwater species that can reproduce and interact with other fish — it's harder to keep tabs on what you have and to keep it all in balance so that you meet the demand for recreational fishing. Trout grow a lot quicker, too. In one year we can grow a fish that's acceptable to the fishing public. It takes much longer with warmwater species. Had there originally been water in

this area, rainbow trout would have been the native species.

Q: How do the fisheries you manage fit into the agency's emphasis on wild salmonids?

A: These fisheries provide recreation. I think they're an important part of the whole scheme of things. We're worried about declining fishing license sales, and a lot of that decline is because of a lack of opportunity on declining native stocks. Fishermen have been displaced from those fisheries, and they've got to have a place to go or they're not going to buy licenses. We have the opportunity here in the Basin with these fisheries, because they are almost completely removed from the native populations of fish, to propagate them and create these fisheries.

I've always believed that anglers go through phases. Initially they're interested in harvesting fish. They want to catch them, have those stringers of fish, and remember that. As time goes on, maybe as they begin to believe they've harvested their fair share, they harvest less and are more keyed in to the pursuit, maybe even to the catch and release stage. I look at my job as providing a diversity of those opportunities, from one end of the spectrum to the other. We need to have those opening day fisheries, those are social events, where people get in on the ground floor, get their kids interested. And then we need to have those lower key fisheries that don't just start off with a bang and the whole thing is over in a month. We need year-round fisheries, walk-in fisheries, where the fishing is slower but steady, where it's more tranquil and things are not so crowded. And then on the far end of the spectrum we need our selective waters where we only allow one fish harvest and we shoot for as high a carryover rate as we can, with very large yearlings and maybe fly fishing only or selective gear or shore anglers only or other restrictions. We try to shoot for a diverse angling experience, where we bring new people in by making it easy for them, and also accommodate the angler whose been into it for a long time and wants more of a challenge.

Q: Some of those anglers have been complaining about competition from cormorants. Are they a serious problem?

A: The first cormorants starting appearing in the Basin in the '70's, and now there's a large rookery in the north Potholes area. One of the contentions of the public as our fisheries have declined around here is that the birds are to blame. We recognize that they have an impact, after all they do eat fish. What we don't know is what fish they eat and what size of fish they eat and do they eat enough at any one lake to have an impact on that fishery. Some people have advocated wiping them out, but of course that's not realistic.

We had an opportunity in the fall of 1997 to get a grad student from the University of Washington's co-op unit in Pullman to start a study in the Potholes seep lakes area, where we thought our highest cormorant impact was, including trout-only, mixed species, and warmwater fish-only lakes. The field work is primarily observation, with randomized selection, where the student is counting cormorants as they come in, watching what they eat, how much they eat, how long they feed, and so on. A lot of what we find out is going to be where were the birds, when did they show up, what fish were in the lake at the time, and what did they eat? By the end of this summer we should have the first results.

But even if we find out that the public's worst fears about cormorants are realized, I doubt that we'd take any major action against the birds. We have to recognize that portion of the public that's adamant about this, and the fisheries themselves, are

not the only constituents we serve and not the only resources we manage. We're not going to sacrifice one species for another. It's the same thing as the sea lions at the locks or the terns at the mouth of the Columbia. I think there's a middle ground. We want to accommodate some of those animals to some extent, even if it costs us some of our recreational management. But we don't want to go the other way either. We're not in this business to enhance the bird population at the total expense of our fisheries — that's artificial in the sense of the birds. You create an artificial population of birds, just like you create an artificial fishery. But cormorants may be the least of our problems in the Moses Lake fishery area.

Q: What's happening with the Moses Lake fishery?

A: We have a newly-funded project coming on line on Moses Lake that's going to concentrate on one of the largest fisheries in the area, where we hope to learn about what's going on there and then apply it to other big waters. The history of Moses Lake is much like that of Banks and Potholes and other large reservoir fisheries — initially they were great fisheries. Moses Lake was the premier crappie fishery in the state. It was also great for bluegill, perch, largemouth bass. But the whole thing started changing in the late '70's and through the '80's it turned around completely — crappie were almost non-existent, it wasn't even worth going out for bluegill, and even the perch fishery finally crashed. Walleye appeared on the scene in ever increasing numbers in the late '80's, early '90's. They were probably always there, but they started to dominate as the predator species. Smallmouth bass seemed to displace largemouth bass, although largemouth could have just been decreasing for other reasons. A lot of changes had taken place and there was no way that I was going to have the resources to look into the situation to understand what had happened. There was a lot of supposition. Everyone had a pet theory — Mt. St. Helens, carp, cormorants and other birds, overharvest, you name it. And none of these things were documented as related to fish populations, so we had little firm data to know what to do in terms of management.

Ten years ago I wrote a proposal for the Columbia River Fish & Wildlife Mitigation Program (BPA mitigation) to fund a research program on Moses Lake to determine what the limiting factors are on that fishery and what enhancement measures would be feasible. Moses Lake is considered off-site in that program, and the study is for non-native species, but it qualifies as substitute mitigation for anadramous fish losses that can never be mitigated. Last year the Bonneville Power Administration finally had some money for the Moses Lake project, which had evidently gained enough importance with the Northwest Power Planning Council, which makes those decisions. We're fully funded for this year — about a quarter of a million dollars — and we're hiring biologists and buying equipment to get the study started.

It's the kind of work that the department has never had the kind of personnel and time and money to do in the past. And the things that have happened in the last ten years with endangered species and all, have put us even more out of the money to do these kinds of things. Our highest priority has to be some of these ESA-driven issues, but it's been at the expense of our recreational fishery resource and we've fallen behind. Lack of manpower to do what we need to do to stay on top of recreational fisheries has been our greatest problem. Long ago these fisheries almost managed themselves when we were in an earlier successional stage of the aquatic habitat here. Now we're constantly setting back succession to keep these waters productive for recreation. And we're dealing with newly introduced species, like walleye. It all just takes more staff time to stay on top of. The warmwater fish enhancement fund that started a few years ago has helped with some of it, but maintaining our basic trout fishery is still a manpower challenge.

Recreational fisheries management can involve a high capital expense and it can conflict with other types of management, other species, or other environmental management beyond WDFW responsibilities to that of DOE or DNR. It's much more complex and expensive today. You don't just go out and dredge a pond or build a dike to set back succession to maintain a fishery — it takes a lot of permitting and haggling with everyone, then a lot of people and money to get a project done. For all those reasons, I'm sure it's difficult for our administration to look at recreational fisheries and see what's necessary out here because they don't have the time to be fully aware of how difficult this has all become. Most all our problems trace back to managing resources in the face of an increasing human population, be it listed species or permit complexity.

I'm a little one-sided about the recreational aspect of our department because that's my job. But then I like to think it's also part of my job to speak out in defense of it. And it is a very, very important part of what we do and what the department means to the public. If we're not doing what the public wants, our case is just going to get worse. Our ability to deal with other things that we need to do as an agency, the things we're charged with doing by the legislature, we're not going to be able to do as well either, because our funding and support will have declined. We have to balance the two.

Q: Do you fish a lot?

A: I fished a lot more before I got in this business! The very best fishing comes at the times of the year when I'm busiest and I'm working long days and weekends. When kids who are anxious to get into this business ask me about my job, that's one of the first things I tell them — it's hard on your hunting and fishing, because you're going to be working when everyone else is playing. When I got into this business I thought I'd make my hobby my work and every day would be a holiday. But work is work, although I am lucky that my work is something that I'm really interested in and I feel good about it. Not everyone can say that. I haven't run across many other jobs that I'd be willing to trade mine for.

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An Interview with Greg Travers, Fish Hatchery Specialist

Greg Travers is a 25-year veteran with WDFW's Hatchery Division. A Fish Hatchery Specialist 3, he has served at the Puyallup, Hoodsport, Dungeness, Sol Duc, Percival Cove and BearSprings Hatcheries. Currently he is serving at the Elwha Rearing Channel west of Port Angeles. The Elwha Rearing Channel's mission is to keep alive the wild Elwha River chinook salmon run as federal and state decision-makers consider removing one or two dams on the river that currently bar the salmon from miles of spawning habitat. To that end, Travers has become an expert at snatching salmon ready to spawn from the river so their eggs and sperm can be used for hatchery production. Raising the young wild salmon in the hatchery ensures more will survive.

Q: What is the problem with the Elwha chinook that requires catching the chinook and bringing them to the hatchery?

A: They don't home in on the water leaving the (hatchery fish) trap. They'll come back to the river but they won't come back to the trap. So we have to go into the river and get them. Basically, the fish in the river are a mix of wild and hatchery fish.

Q: Why won't the fish come back into the trap?

A: We take a little bit of water out of the Elwha for the hatchery and shoot it back into the river. There isn't enough distinction between what's coming through the trap and what's in the river so the fish just stick in the river.

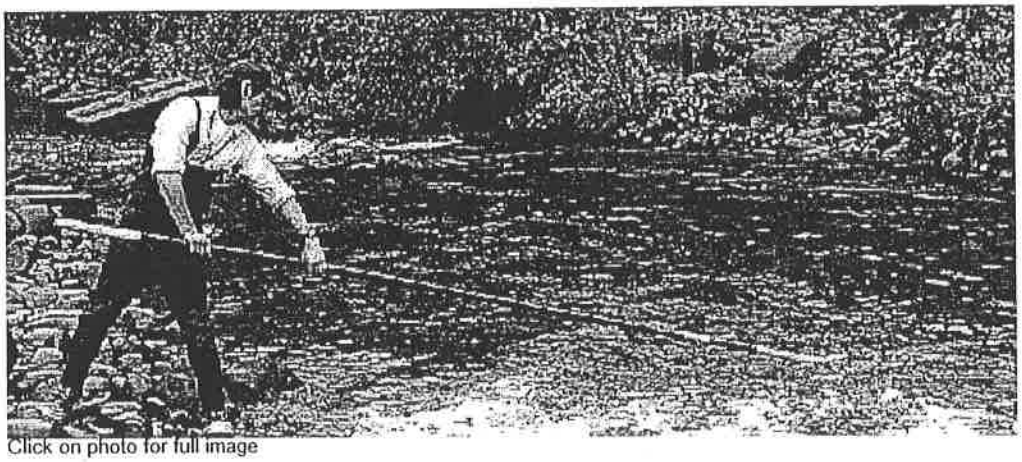
Q: Doesn't this hatchery have an important role in trying to restore the wild chinook run in the Elwha?

A: We've maintained the run and probably with dam removal we'll be more involved in restoring the wild chinook.

Q: Catching these fish requires a special skill, how do you do it?

A: We target spawning chinook. We gaff them with 15-20 foot poles topped with large hooks. We go out and watch for spawners. We snag them and take their eggs and sperm right on the river. Then we take the eggs and sperm to the Hurd Creek

Hatchery because we don't have incubation facilities at Elwha Channel.



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Q: Is snagging salmon difficult?

A: It is demanding at times. The hook releases once the fish is snagged. Then you fight salmon up to 40 or 50 pounds on about a 5-foot line. In some sections of the river you do a lot of walking looking for one or two fish, a fish here and fish there. In other areas where there is a little better gravel there may be 10-15 pairs spawning at one time. you have to be very patient on the river. You have to learn the water and how the fish are going to react in different areas and types of water and then it becomes easier. For example, if there is more than one fish, always approach from the downstream side. If you spook them ... if you approach from the upstream and there are five pairs spawning, you are going to lose them all. Always target the females first ... you learn there is usually a head fish in the group. If there are four males and a female, she is usually the head fish.

Q: It's like fishing requiring stalking?

A: You need patience just to get out to the fish and you have to learn how to judge the distance from the tip of the pole to how close you are to the fish. You have to make sure you get that pole past that fish. You can't just stick the pole out. You have to kind of draw the pole down with the current. You judge the fish is, say 12 feet from you, you draw it down in the current and you better be right. That takes a while to learn. You also have to learn to read depth. You don't want to hurt or kill the fish if it's not ripe. You learn to pull the pole when the hook is at the head and you'll get it just below the dorsal (fin). You don't want to hook it deep. If you hit in the dorsal you can release it. We get very few fish that aren't ripe by this method because we watch them. We may get one or two a year that aren't ripe because once in a while fish pass through an area where we know there are a lot of spawners. Usually we can release salmon that aren't ripe and catch them a week or two later when they are ready to spawn.

Q: Describe stalking the fish.

A: You work slowly out to the fish and wait until it is in the right position. You have to have your feet planted just right, because once you have them they are going to take off. You wait while males are moving in and out and the female will be moving up and down a little bit. If you miss the female, she'll go but the males will stick around, trying to see where the heck she's gone. You get a feel for when it's right after a year or two. That is why you have to be patient.

For example, there are spots where we know we have a real tough time getting a fish for whatever reason. If you let a female spawn in one of those spots, she will keep the rest of the females away from that spot for two to three weeks until she dies. Then the other females come back to a spot where you can get at them. You don't want to spend 45 minutes to an hour trying to get a fish that is almost impossible. You learn that over a period of time, the spots that you can't get at.

Q: How much of the river do you cover and how many fish do you take?

A: Bob Colvin (another WDFW Elwha employee) and I probably cover 2 miles or 2.5 miles of river. It varies, this year we were up to about 720 chinook between the two of us. We usually take over half of our eggs by this method. We are looking at 4.75 million eggs a year so we gaff roughly 700 to 1,000 fish in maybe five weeks, gaffing every day.

Q: Did you develop this technique?

A: No, Ernie Brennan, who was the manager of the Dungeness Hatchery for many, many years, started it, as far as I know. I inherited it.

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