

**CLIMATE CHANGE, FISH AND TRIBES**



# CLIMATE CHANGE, FISH AND TRIBES

A Paper by Steve Robinson

Just outside this building you can see, hear and experience the biggest ocean in the world—an incredible body of water that connects with the other oceans of the world, which connect with all of the lands, the precious few fresh waters and all of the fantastic forms of life, each and every one of which interconnect with our own. Every year, due to the carelessness of man, we see dozens of these species disappear from this planet—never to be seen again—and each time that happens, each time a species goes extinct, it is a tragedy beyond measure—a piece of us....dies.

Today, whether people realize it or not, we are at a crossroad---we have a choice we must make, and we must be careful about the wisdom we amass in making that choice because it will affect every form of life, including our own children, for generations to come.

The question is simple. Will we do what it takes—whatever it takes—to demonstrate our love and concern for our children to come, or will we choose to be arrogant, self-serving and greedy, and living life just for the moment, exploit our Mother Earth for every penny we can squeeze out of her and not give a damn what the future might bring as a consequence? Will we devote ourselves to being good stewards and caretakers of the land or will we hide under the blanket of apathy and pretend that the many challenges that are this very moment encircling us....just do not exist?

I can really only speak for myself. I don't know how many years I have left in this life, or how much longer my strength will last, but whatever there is left of it, I dedicate it to the animals, the plants, the children and my fellow human beings.

This much I know. We—all of us—will be able to make a difference—if we work together. Indian, non-Indian. Government. Non-government. No matter what color we are, or where we come from. If we find a way to call each other brother and sister, we can find solutions to any challenge, anywhere, any time.

A wise man once said it takes wisdom to learn from our own experiences and mistakes.....it takes genius to learn from the experiences and mistakes of others. I would never presume to come onto Quinault land and advise the Quinaults who to listen to or how to live. In fact, if I were to advise anyone, it would be to advise all the rest of us to learn from the Quinault people, because the lessons conveyed by their grandparents are, among other things, to celebrate the salmon.

Imagine a Northwest without salmon. Unthinkable as that thought is, the Coast Salish people of the Salish Sea encompassing British Columbia, Canada and western Washington Tribes know from their own observation and scientific modeling that climate change could lead to such a disaster. And it would be a disaster. Salmon are a keystone species that provide food for many species. They are our miner's canary when it comes to clean air and clean water. They are the backbone of our economy and the cultural spirit and way of life of the Northwest.

*Cover photo by Debbie Preston*

But they are most definitely in trouble. Carbon dioxide levels could double by 2050 meaning many remaining salmon species would move to the poles, leading to extinction in the Northwest and most of Canada.

From the time when European ships first appeared on the horizon, when frontiersmen first wandered aimlessly through the forest and settlers first trudged across the trails to stake their claims to Indian lands and resources, things have been in a constant state of change. Non-Indians have subjugated the red man at every opportunity, spread diseases, violated treaties and built towns, roads and cities. They have poisoned the air and polluted the water with little remorse and it was not until the tribes successfully reasserted their rights and a few caring non-tribal people finally discovered there are things more important in life than money began to organize into environmental groups that there was any challenge to the gluttonous resource frenzy and wanton savage scourge to Mother Earth. But even now it goes on, bandaged here and there perhaps by the occasional hand slap from an underfunded government bureaucracy, incessantly talked about in the halls of Congress, but nonetheless ravaged by a population that has doubled, then tripled and an unquenchable thirst for water that has become more scarce by the generation.

On top of all of this comes climate change. But climate change is more than just some afterthought problem that sits on the heap of other environmental challenges we face. Rather it is the culmination of 100 years and more of greedy people searching for gold and other resources found to have value and not giving a damn who or what they push out of the way to get it. It's the result of partitioning the land in a selfish fight for what's mine and to hell with you, and to hell with what we do to the land to get it. It is Nature slapping back at man for the insensitivity he has demonstrated for the past seven generations—over the objection of the Native American.

And so now, our glaciers are melting. Our waters are turning into acid and currents sweep in minus oxygen, killing virtually everything in their path.

My speech today was supposed to concentrate on the impacts of climate change on fish.

Well, here's a simple fact. As goes the habitat, so go the fish. Salmon are fighters, let there be no doubt. From the start of its life, through its ocean voyage and its battle to make it back upstream to its place of origin, this is true. In fact, if people fought half as hard to save the salmon as salmon fight to save themselves, we would find ourselves back in a day when you could cross streams and even mighty rivers walking on their backs. But from the time of the industrial revolution we have instead polluted the rivers, uprooted the uplands and in a thousand other ways managed to turn their homes into places where their struggle to survive is in question.

One of the greatest challenges related to climate change is, of course, the acidification of our waters. With the oceans absorbing more than 1 million tons of carbon dioxide an hour, a National Research Council study released recently has found acid in the oceans is increasing at an unprecedented rate and threatening to change marine ecosystems. The council said the oceans are 30 percent more acidic than before the start of the Industrial Revolution roughly 200 years ago, and one-third of today's carbon dioxide emissions are absorbed by the oceans.

Unless emissions are reined in, ocean acidity could increase by 200 percent by the end of the century and even more in the next century. Ocean acidification is changing the chemistry of the oceans at a scale and magnitude greater than thought to occur on earth for many millions of years and is expected to cause changes in the growth and survival of a wide variety of marine organisms, potentially leading to massive shifts in ocean ecosystems. Senator Maria Cantwell

recently said, “We know that this is changing the very chemistry of our oceans. And while the full implications of these changes aren’t clear, the initial signs are frightening.”

The effects of growing ocean acid levels might be more pronounced off the Northwest coast. Cold water absorbs more carbon dioxide than warm water. And a phenomenon known as “upwelling” off the coast of Washington state and Oregon brings deep ocean water already more acidic to the surface, where it is saturated with even more carbon dioxide. According to one study, upwelling of acidified water off the West Coast had reached levels not anticipated until 2050.

The preponderance of scientists in the world know climate change exists. So do 90 percent of the people in the country now, even though the remaining 10 percent make more than half of the noise. Tribal members who listen to the messages of their ancestors have known it’s been with us for years. They have listened to the lessons that have been carried from generation to generation for thousands and thousands of years and they know that the changes we are witnessing now are not just some trend that the Earth goes through naturally every now and then as a normal course of events. They know that what we are witnessing, and what we are about to witness in the form of warming, offset by freezes, and massive algal blooms and sea level rise, acidification of the waters and hypoxia-caused fish kills, massive shellfish deterioration and intensified storms accompanied by hurricanes, tornadoes, floods and droughts, dryness, forest fires, tsunamis, species depletion, invasive species invasions and salt water intrusion are unlike anything experienced for millennia. They know that what we are experiencing and what we are about to experience has been brought on by man’s arrogant behavior and wasteful ways.

Over the years enough poison has been belched into the air through smoke stacks and exhaust pipes, enough forests have been cut down here and around the world, enough land has been covered by asphalt and concrete, enough wetlands have been destroyed and enough CO<sub>2</sub> has been ejected into the skies in a hundred other ways that now..... the piper has to be paid.

The Tribes have known for a long time that you don’t spit upon Mother Earth and expect any different result. That is a simple fact that sixty percent of Americans just don’t understand.

Amazingly, after everything that has been proved, only 40 percent of Americans now believe that climate change has been induced by man’s activities.

From one perspective, that amazing figure may not matter. Climate change is here. We’re seeing its effects. They will get worse, and we have to adapt to survive. As far as that goes, one might say that it doesn’t matter what caused it. It’s more important to have a pretty good handle on its effects, so we can be better prepared to adapt to it:

- Coasts will continue to erode and sea level will continue to rise—disturbing natural habitat such as coastal wetlands.
- Warming in western mountains is projected to cause decreased snowpack, more winter flooding, and reduced summer flows—killing more fish and wildlife.
- Disturbances from pests, diseases, and fire are projected to have increasing impacts on forests, with an extended period of high fire risk and large increases in area burned.
- Heat waves and larger droughts will increase during the course of the century causing grave risk to the elderly.
- We will experience more frequent heavy rain and snow events.

- The resilience of many ecosystems will be exceeded this century by an unprecedented combination of climate change and associated disturbances
- There will be major changes in ecosystem structure and function, species' ecological interactions, and species' geographic ranges, with predominantly negative consequences for biodiversity, and ecosystem goods and services e.g., water and food supply.”
- Regional changes in the distribution and production of particular fish species are expected due to continued warming, with adverse effects projected for aquaculture and fisheries.
- Projected climate change is likely to affect the health status of millions of people through increases in malnutrition; increased deaths, disease and injury due to heat waves, floods, storms fires and droughts; and altered distribution of some infectious disease vectors.
- There will be reductions in thickness and extent of glaciers and ice sheets, particularly in polar regions “and changes in natural ecosystems with detrimental effects on many organisms including migratory birds, mammals and predators.

## **JUST WHAT CAN BE DONE ABOUT IT?**

### *Coordination*

**None of us are alone in this. Climate Change will affect all of us, and we must build alliances to be able to be effective in responding to it.**

## **WHAT OTHERS ARE DOING WHITE HOUSE**

### **Climate Change Adaptation Task Force**

In 2009, the White House Council on Environmental Quality (CEQ), the Office of Science and Technology Policy (OSTP), and the National Oceanic and Atmospheric Administration (NOAA) initiated the Interagency Climate Change Adaptation Task Force, which includes representatives from more than 20 Federal Agencies. When the President signed the Executive Order on Federal Leadership in Environmental, Energy, and Economic Performance, on October 5, 2009, he called on the Task Force to develop, within one year, Federal recommendations for adapting to climate change impacts both domestically and internationally.

1. On March 16, 2010, the Task Force released an Interim Progress Report which outlines the Task Force's progress to date and recommends key components to include in a national strategy on climate change adaptation.

The Interagency Climate Change Adaptation Task Force formed workgroups to consider the capabilities of the Federal Government to respond to the impacts of climate change on various critical sectors, institutions, and agency mission responsibilities. Five initial workgroups began by reviewing existing policies, operations, procedures, and other tools that affect the Federal Government's response, and will suggest options for improving the government's capacity for adaptation to climate change. The five initial workgroups are focused on the following topics:

- **Agency Adaptation:** Develop recommendations on how agencies should plan and implement adaptation
- **Science Inputs to Policy:** Develop recommendations to couple the production of scientific and technical support to adaptation planning, prioritization, and resilience building within the USG, in the US, and internationally

- **Insurance:** Develop recommendations on opportunities for the United States Government to support insurance and adaptation issues
- **Water Resources Adaptation:** Develop recommendations on how Federal water management agencies should plan and implement adaptation actions related to climate impacts on water resources
- **International Resilience:** Develop recommendations on opportunities for the United States Government to support and lead international adaptation efforts

These workgroups have defined their scope and end products, and have begun initial analysis. Most workgroups have used stakeholder listening sessions to solicit feedback from various government and regional actors on adaptation issues within their respective issue area.

The 2009 United Nations Climate Change Conference, commonly known as the Copenhagen Summit, was held in Copenhagen, Denmark, between 7 December and 18 December. A framework for climate change mitigation beyond 2012 was to be agreed there. The Copenhagen Accord was drafted by the US, China, India, Brazil and South Africa on December 18, and judged a "meaningful agreement" by the United States government. It was "taken note of", but not "adopted", in a debate of all the participating countries the next day, and it was not passed unanimously. The document recognized that climate change is one of the greatest challenges of the present day and that actions should be taken to keep any temperature increases to below 2°C. The document is not legally binding and does not contain any legally binding commitments for reducing CO<sub>2</sub> emissions. Many countries and non-governmental organizations were opposed to this agreement.

## **WHITE HOUSE**

In DC, we finally have an administration that understands the meaning of climate change. However, the track record so far is NOT that great.

The U.S. still has not signed United Nations Declaration on the Rights of Indigenous Peoples. The Copenhagen Agreement was a joke. Congress is dragging its heels, and the White House is putting its stock in a Climate Change Adaptation Work Force.

The Federal Task Force has identified these priorities:

- A unified strategic vision and approach
- An understanding of the challenges at all levels of government
- Organized and coordinated efforts across local, State and Federal agencies
- Strong links between, and support and participation of, Tribal, regional, State, and local partners
- Coherent research programs to identify and describe regional impacts
- Relevant climate change and impact information that is accessible to and usable by decision-makers and practitioners on the ground
- Comprehensive and localized risk and vulnerability assessments
- A strategy to link resources, both financial and intellectual, to critical needs
- A robust approach to evaluating and applying lessons learned

The Task Force seeks to address these gaps and recognizes that adaptation and resilience will require a set of thoughtful, preventative actions and investments, and will demand new

approaches and preparation from all segments of society. To promote this, the Task Force determined a national strategy should address at a minimum the following six components:

1. **Science Inputs to Adaptation Decisions and Policy.** The Task Force may recommend approaches for coordinating, developing, distributing and integrating science, from physical to socioeconomic, into all aspects of adaptation.
2. **Communications and Capacity-building.** The Task Force may develop recommendations for communicating climate change impacts, adaptation, and resilience and for building capacity within the U.S. Government, including prioritizing opportunities for additional training and resources.
3. **Coordination and Collaboration.** The Task Force may develop recommendations for structuring the national adaptation strategy within the Federal Government and for increasing and improving coordination and collaboration across the Government and with partners.
4. **Prioritization.** The Task Force may consider and make recommendations for how to identify priorities. The Task Force has begun work on several areas that may require a coordinated government response, and is developing recommendations for water resource management and for international adaptation and resilience. The Task Force will add additional areas as it continues its work.
5. **A Flexible Framework for Agencies.** Adapting to climate change and building resilience requires planning within and across agencies. There is no single planning approach appropriate for all agencies, but each should use a consistent framework to facilitate coordination and allow agencies to leverage common tools and methods. The Task Force may implement agency pilots to further develop and test the framework, and will continue to develop recommendations on the common tools required to support implementation.
6. **Evaluation.** Adaptation plans must allow for a “feedback” mechanism, whereby new information, lessons learned, and modified priorities can be incorporated into ongoing adaptation processes. Evaluation and lessons learned will help provide clear guidance for decision-making that enhances adaptation and resiliency. The Task Force may develop recommendations for how to evaluate the success of adaptation and resilience-building efforts.

The White House will conduct listening sessions in concert with the Interagency Task Force, and by the end of this year the Task Force will report to the President on the development of domestic and international dimensions of a U.S. approach to climate change adaptation and what Federal Agencies are doing to support this effort. The Task Force also will recommend additional aspects to consider in the development of a comprehensive national strategy.

All of this frankly seems to be at a snail’s pace. Meanwhile, the White House is also advocating nuclear energy, offshore drilling and “clean” coal in the quest for energy independence. In my opinion, none of these are good options. In fact, two of them are fossil-fuel based and would likely contribute to the climate change problem.

We cannot sit on our hands. We cannot study it to death. We have to set goals and take action. And the fact is that whether you are talking about individual watersheds here in our part of the world, or in coordinated efforts to find common solutions worldwide, the indigenous people are—right now—far ahead of other governments in the response to the challenges that climate change has presented.

Nowhere is this more evident than in Congress.

## **CONGRESS**

Activists around the country are AGAIN joining together to call their senators and demand a real climate bill -- one that protects people and the planet, not polluters. The Waxman-Markey Bill and other legislation has floundered, as has other legislation. There are some new bills, but they're mostly study-oriented and some of the Climate proposals being considered to date would reportedly roll back the Clean Air Act, handcuff states pushing forward with solutions, virtually ignore tribes as governments, and provide massive giveaways and loopholes to corporate special interests, all in exchange for pollution restrictions far weaker than what scientists say are needed to protect the climate.

There are, of course, some little glimmers of hope on Capitol Hill. S.2877 for example. Known as the Carbon Limits and Energy for America's Renewal, or CLEAR Act, sponsored by Senator Maria Cantwell, this legislation would limit carbon emissions and require the President to reduce greenhouse gases relative to 2005 levels by 20% by 2020, 30% by 2025, 42% by 2030 and 83% by 2050. But it hasn't seen any action this year and appears to have floundered in the Committee on Finance. Other bills. S 3032, by Sen. John Barrasso of Wyoming would prohibit enforcement of a climate change interpretive guidance issued by the Securities and Exchange Commission. It saw action in late March, being referred to the House Committee on Financial Services, but seems to be floundering. As difficult as it is to believe, we still have members of Congress who stand up publicly and declare that climate change is a farce.

Let's take a look at what some of the federal agencies are doing on their own.

## **NOAA**

In an announcement in February, the Department of Commerce and NOAA proposed establishing a NOAA Climate Service, saying that it is important and even vital to make the conclusions of top scientists—that climate change IS REAL—more accessible to the public. The NOAA Climate Service will encompass a core set of longstanding NOAA capabilities with proven success. The climate research, observations, modeling, predictions and assessments generated by NOAA's top scientists – including Nobel Peace Prize award-winners – will continue to provide the scientific foundation for extensive on-the-ground climate services that respond to several requests each day for data and other critical information.

## **EPA**

EPA Publishes National U.S. Greenhouse Gas Inventory. EPA Formally Announces Phase-in of Clean Air Act Permitting for Greenhouse Gases/Agency reiterates no stationary source requirements until 2011.

## **USFWS**

When it comes to species protection, the agency that seems to have been the busiest is the USFWS, which has released a climate change plan to conservation partners and the public for review and comment. Its plan establishes a basic framework within which the Service and its employees will work with the larger conservation community to safeguard fish, wildlife and their habitats in the face of accelerating climate change. It looks broadly at how climate change is affecting fish, wildlife and their habitats and what the agency's role will be in the conservation community as it addresses climate change.



A group of career Service employees developed a series of short-term actions designed to lay the groundwork for future actions on climate change--already being implemented. Team also developed a set of proposed actions designed to implement the draft Strategic Plan over the next five years. It often happens that former employees make more solid recommendations than current employees, which may say something about the bureaucratic process.

### *Adaptation*

**Goal 1** – Develop and apply capacity for biological planning and conservation design to drive conservation at broad landscape scales.

Proposed actions include:

Develop a National Fish and Wildlife Adaptation Strategy;

Access regional climate science and modeling expertise through regional climate science partnerships;

Develop Landscape Conservation Cooperatives to acquire biological planning and conservation design expertise;

Conduct species and habitat vulnerability assessments;

Incorporate climate change into all Service activities and decisions;

Provide requested support to State and Tribal Managers to address climate change issues that affect the Service's Trust Resources;

Evaluate laws, regulations and policies to identify barriers to and opportunities for successful implementation of climate change actions.

**Goal 2** – Plan and deliver landscape conservation that supports climate change adaptations by fish, wildlife, plants and habitats of ecological and societal significance. Proposed actions include:

Implement National Fish and Wildlife Adaptation Strategy as the Service's long-term adaptive response to climate change;

Take conservation action for climate vulnerable species;

Promote habitat connectivity and integrity;

Identify and fill priority freshwater needs;

Manage genetic resources;

Reduce susceptibility to diseases, pathogens and pests;

Conserve coastal and marine resources;

Address Fish and Wildlife needs in renewable energy development;

Reduce non-climate change ecosystem stressors;

Foster international coordination for landscape conservation.

**Goal 3** – Develop monitoring and research partnerships that will provide complete and objective information to plan, deliver, evaluate and improve actions that help fish and wildlife adapt to accelerating climate change. Proposed actions include:

Develop a National Biological Inventory and Monitoring (I&M) Partnership;

Promote physical science and remote sensing monitoring programs;

Develop research and monitoring capability for use in landscape conservation;

Further develop collaborative research partnerships.

### *Mitigation*

**Goal 4** – We will achieve carbon neutrality by 2020. Proposed actions include:

- Reduce the carbon footprint of the Service’s facilities, vehicles, workforce and operations;
- Reduce the Service’s land management carbon footprint;
- Offset the remaining carbon balance.

**Goal 5** – Build capacity to understand, apply and share biological carbon sequestration science and work with partners to sequester atmospheric GHGs in strategic locations. Proposed actions include:

- Develop biological carbon sequestration expertise;
- Develop standards, guidelines and best management practices for biological carbon sequestration;
- Integrate biological carbon sequestration activities into landscape conservation approaches;
- Facilitate biological carbon sequestration internationally;
- Facilitate biological carbon sequestration research;
- Evaluate geological carbon sequestration.

### *Engagement*

**Goal 6** – Engage Service employees, public and private partners, key constituencies and stakeholders, and everyday citizens in a new era of collaborative conservation to seek solutions to the impacts of climate change and other 21st century stressors to fish, wildlife and habitats.

Proposed actions include:

- Provide Service employees with climate change information, education and training;
- Share climate change information, education and training opportunities with external audiences;
- Forge alliances and create forums on climate change to exchange information and knowledge and to influence policy internationally.

### **Meeting the challenge**

Climate change must become our highest priority. Consequently, we will deploy our resources, creativity and energy in a long-term campaign to reduce greenhouse gas emissions and safeguard fish, wildlife and their habitats. Our strategic plan commits us to reaching inward to every part of our organization and reaching outward to the larger conservation community to tackle climate change as a community venture and build the philosophies, relationships and capabilities needed to succeed. With all the steps laid out in this Action Plan, we will move forward enthusiastically in working across the conservation community to usher in a new era of interdependent conservation that will sustain fish, wildlife and their habitats in the face of climate change.

### **WHAT ABOUT THE TRIBES? WILL THEY BE LEFT BEHIND OR WILL THEY LEAD THE WAY?**

Now for the rubber to hit the road. Truth be known, no group of governments on Earth has been so attentive to, or active in demand for action in response to climate change as the indigenous peoples. The primary objectives of Tribal Councils are to protect the interests and needs of their members and their descendants. Obviously, as in the case of climate change, this may entail finding ways to unite efforts with other tribes and thereby gain strength in numbers.

## **The Anchorage Declaration 24 April 2009**

From 20-24 April, 2009, Indigenous representatives from the Arctic, North America, Asia, Pacific, Latin America, Africa, Caribbean and Russia met in Anchorage, Alaska for the Indigenous Peoples' Global Summit on Climate Change. Solidarity was expressed among all the Indigenous Peoples there. They reaffirmed the unbreakable and sacred connection between land, air, water, oceans, forests, sea ice, plants, animals and our human communities as the material and spiritual basis for our existence.

Delegates expressed deep alarm at the accelerating climate devastation brought about by unsustainable development. They said they are experiencing profound and disproportionate adverse impacts on our cultures, human and environmental health, human rights, well-being, traditional livelihoods, food systems and food sovereignty, local infrastructure, economic viability, and our very survival as Indigenous Peoples.

Mother Earth is no longer in a period of climate change, but in climate crisis. We therefore insist on an immediate end to the destruction and desecration of the elements of life.

Through our knowledge, spirituality, sciences, practices, experiences and relationships with our traditional lands, territories, waters, air, forests, oceans, sea ice, other natural resources and all life, Indigenous Peoples have a vital role in defending and healing Mother Earth. The future of Indigenous Peoples lies in the wisdom of our elders, the restoration of the sacred position of women, the youth of today and in the generations of tomorrow.

They upheld that the inherent and fundamental human rights and status of Indigenous Peoples, affirmed in the United Nations Declaration on the Rights of Indigenous Peoples (which still has not been signed by the United States), must be fully recognized and respected in all decision-making processes and activities related to climate change. This includes indigenous rights to lands, territories, environment and natural resources. When specific programs and projects affect our lands, territories, environment and natural resources, the right of Self Determination of Indigenous Peoples must be recognized and respected, emphasizing our right to Free, Prior and Informed Consent, including the right to say "no".

### **Calls for Action**

1. In order to achieve the fundamental objective of the United Nations Framework Convention on Climate Change, the indigenous delegates supported a binding emissions reduction target for developed countries of at least 45% below 1990 levels by 2020 and at least 95% by 2050. In recognizing the root causes of climate change, participants call upon States to work towards decreasing dependency on fossil fuels. They further called for a just transition to decentralized renewable energy economies, sources and systems owned and controlled by our local communities to achieve energy security and sovereignty. They agreed to several other points and summed up by saying:

**We offer to share with humanity our Traditional Knowledge, innovations, and practices relevant to climate change, provided our fundamental rights as intergenerational guardians of this knowledge are fully recognized and respected. We reiterate the urgent need for collective action.**

*Agreed by consensus of the participants in the Indigenous Peoples' Global Summit on Climate Change, Anchorage Alaska, April 24<sup>th</sup> 2009*

*Also signed by the Secretary General of the United Nations.*

That's the kind of agreement the indigenous people of the world have been able to develop....and they're still developing agreements that are both insightful and far-reaching. This agreement, which went even deeper into detail and provided a logical plan for dealing with the Climate Change crisis, was virtually ignored in Copenhagen.

Sooooo....what kind of agreements are the non-tribal nation states of the world able to come to? Copenhagen. By many accounts.....a total failure.

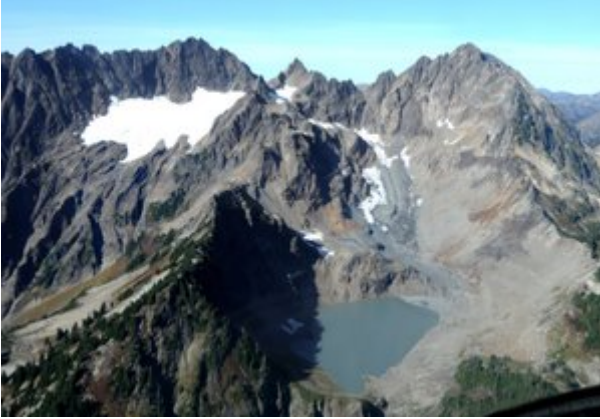
At best, it was an inconsequential agreement to continue to study the problem by some nations.

### **Impacts to fish**

Throughout the Northwest, impacts from climate change are already beginning to be seen as winter storms have intensified, algal blooms have led to hypoxia and consequent fish kills in Hood Canal, glaciers are melting and hypoxia comes in ocean currents, leading to occasional massive fish kills on the ocean. Also, the warmer waters have also driven feeder fish to other waters and the resulting starvation works its way up the food chain to salmon, to whales and eventually to empty freezers on fish-dependent reservations. The effects of drying forests have already led to intensified insect and disease infestations in the forests, especially along the eastern Cascades, and forest fire seasons come hand-in-hand in summer and fall droughts. Rivers run low and have left areas of dryness, beaches erode as the sea level has begun to rise and invasive species that prefer the warmer waters have already begun to frequent waters where they've not been seen before. These effects compile with the acidification that results from CO2 mixing with the waters and shellfish growers are already having problems with shellfish larvae being able to spawn. Combined with toxics and degradation of uplands, riparian areas, nearshore habitats and uplands, and the stage is set for salmon and other fish species to have major problems in the years to come.

One example challenge is right here at Quinault, where Anderson Glacier, at the headwaters of the Quinault River, has shrunk to a fraction of its former self. This will lead to warmer stream waters, which will be dependent solely on rain in the future, and temperatures will rise above the 60 degrees required by salmon. Salmon are fighters, but if they don't have a home, they will die.

### ***Quinault as an example:***



*Anderson Glacier is the headwaters of the Quinault River. Photo by Larry Workman, QIN*

These glaciers once provided large amounts of cold water year round that maintained higher summer flows. Lower flows mean less habitat for spring/summer Chinook runs in the Queets and Quinault rivers on the Olympic Peninsula, which already face many other threats to their survival. Glaciers are melting throughout the Olympics and Cascades and the melts are already beginning to impact streamflows and water temperatures.

Warmer waters at sea and in the rivers are not conducive to salmon life and although we still see runs today, these are problems that must be dealt with. Salmon need their 60 degrees, their shade from healthy riparian areas and their free flowing clear water. They need their feed, much of which heads north to cooler waters as the waters here heat up. They need to have oxygen in the water, often deprived from them by massive algal blooms or jet streams that carry hypoxia. They need their estuaries and wetlands, which can be wiped out by rising sea levels.

## **SOLUTIONS**

Fundamentally speaking, most solutions to such challenges do not have to be complicated. Cut down on the CO<sub>2</sub> in the air, restore and protect natural habitat—such as wetlands, estuaries, forestlands, etc. But the fact is that much of the damage has been done and many impacts are going to occur. Therefore, much of the response has to take the form of adaptation. There will be eroding tidelands and elevating sea levels. There will be fish kills, just like we have already witnessed off the coast. There will be invasive species and there will be tempests like we haven't experienced before. But, with adaptation and good stewardship, we can have an impact. We can help save salmon and we can bring back some of the other cultural resources that the tribes have lost or are in the process of losing.

Much of the solution to climate change is adaptation, because many of the effects will come, and survival will mean change. Just as many tribes have adapted to gaming income to help deal with massive unemployment challenges, and some have increased their dependence on shellfish harvest as their salmon runs have dwindled, the tribes of the future will have to adapt to now forms of income. But one truth remains constant. The tribes are caretakers of the land, their identity will revolve around salmon. The Northwest tribes are fishers, hunters and gatherers. This part of their culture must be maintained in some capacity for them to remain true to themselves. They will always fight to protect and restore habitat, so that salmon, in whatever numbers will have a home to come back to, and so that hopefully those numbers will increase.

The tribes have also distinguished themselves as good co-managers, even if their good intentions have been ignored, jilted, spat upon or taken for granted. There is wisdom in understanding that this part of the world, like the rest of the world, is occupied by people from other lands now. And these people must learn to conserve. They must learn to exploit less and invest more of their time, energy and money in habitat restoration. They must be better stewards and better neighbors and mend their wasteful ways. If they don't, the hill will be too steep to climb and we will never be able to catch up with the pace of wastefulness and pollution they have established. We must walk the path of respect together, to the fullest degree possible, government-to-government and hand-in-hand. We must all learn to care about our children.

If the various jurisdictions can learn to love their Mother Earth, as the tribes love her, and treat her with the respect she deserves, we will find a way to deal with the effects of climate change. Unity and brotherhood are absolutely key to our success.

It has been pointed out that tribes have been the most assertive of governments in the response to climate change challenges. It follows that traditional knowledge, as well as contemporary knowledge, and application, play important roles in this response. One of the challenges in traditional knowledge is a point of reference. People today, even indigenous people, are born without the same visible frame of reference as their ancestors. The forest is not the same. Even the rivers have changed. But although they have certainly dwindled, oral histories, customs and cultures have survived from one generation to the next to an extent that when combined with the physical evidence of our villages and our tools and the gut level instincts we feel as a people, we know that the juvenile trees that cover our mountainsides are not doing the job that the giant cedars once did. We know that the salmon we harvest today are not the same as the 100 pounders they once were. We know the industrious beavers who did so much to make our rivers healthy are gone and that the multitude of animals who contributed to the thick forest duff are no longer among us. Look at the roots of a forest tree and you do not see pools of water among rising roots, being held and filtered slowly into the aquifers as they once did. We know the ecosystem is not healthy. It has changed, and not for the better. We live in a sick world.

But there are ways to cure some of this sickness. There are things we can do—if we open our eyes to the challenge, and choose to do so—now. The tribes are working, hard, on each watershed, every day, to restore wetlands and pools, to rehabilitate an environment that can once again sustain fish and wildlife. We can let trees grow in some areas, and not cut them down. We can recruit forest duff, and reintroduce beavers to the natural environment. We can choose to leave some of what the Creator made alone, and not disturb it. We can choose to work together. Working together, we can clean up the waters, restore the natural habitat, manage the forests properly and do the work that is necessary to survive.