ONE PEOPLE-ONE RIVER

Yukon River Inter-Tribal Watershed Council

# Yukon River Watershed Plan

## August 2013

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## Purpose of the Watershed Plan and Summary of its Elements

This is a plan to protect and improve the water quality in the Yukon River from the headwaters to the mouth, mainstem and tributaries. The First Nation and Tribal governments of the Yukon River, working together through the Yukon River Inter-Tribal Watershed Council, have developed this plan to ensure the Yukon River will continue to sustain the coming generations of all the people, fish, wildlife and plants of the Yukon. The plan combines the best of modern science and policy and the traditional knowledge of the indigenous governments and people of the Yukon River, and includes enforceable standards to protect the quality, quantity and flow of the water in the river.

The Yukon River Watershed Plan is organized around a framework that begins by describing the Tribes' and First Nations' long-term **Vision** and **Objectives** for the Yukon River watershed. This is followed by the centerpiece of the plan, a set of specific **Water Quality Standards** describing the quality of the river water necessary to achieve the vision and objectives. The water quality standards are aimed at improving and protecting the quality of the river's water to sustain the health of the people and protect the fish and wildlife habitat of the watershed.

The water quality standards will eventually be followed by a set of **Actions** intended to monitor the quality of the river's water against the standards, identify existing or potential threats to the standards and actions to protect or improve the quality of the water in order to meet the water quality standards. The plan begins an ongoing effort to identify and address the threats to the water quality of the Yukon River, including the adverse effects of mining, transportation, municipal development, and abandoned mining and military sites. To a certain extent these actions will emerge from local and reach-specific planning efforts that will identify specific threats to water quality and the necessary responses to those threats, local planning efforts that will be consistent with this basinwide or "umbrella" plan and its water quality standards.

The plan includes a general strategy for **Implementation** of the water quality standards and to realize the Watershed Council's vision and objectives. The Yukon River Tribes and First Nations expect to enter into government-to-government discussions with the other sovereign governments in the Yukon River basin about implementing the water quality standards and other elements of this watershed plan. The plan is designed with the assumption that the Tribes and First Nations will work cooperatively, individually and collectively through the Watershed Council, with the other sovereign entities in the basin to secure recognition and implementation of these standards as well as the appropriate participation of the Tribes and First Nations in the governance of the river. Considerations that relate to the governance of the river are embedded in the plan's framework, largely through the Objectives and the Implementation section. The plan focuses for now on how these elements might serve the ultimate purpose – that is, how a tribal role in the governance of the river can serve to help protect the resource and sustain the life of all the people who will live along the river for generations to come, including support for the fish, wildlife and plants that are essential to their lives.

Finally, the Watershed Plan is designed so that each Tribe and First Nation will be able to consider and endorse the water quality plan and standards and key implementation provisions. At the conclusion of the plan are model ordinances and resolutions for this purpose.

## Vision

*We, the Indigenous Tribes and First Nations from the headwaters to the mouth of the Yukon River, having been placed here by our Creator, do hereby agree to initiate and continue the clean up and preservation of the Yukon River for the protection of our own and future generations of our Tribes/First Nations and for the continuation of our traditional Native way of life. Our vision, put simply, is to be able to drink water directly from the Yukon River.*
***Yukon River Inter-Tribal Watershed Council***

The **Vision** of this Watershed Plan is a Yukon River of such quality that it directly sustains the health and prosperity of all the people and communities in the Yukon River Basin, including abundant, healthy, diverse populations of the fish, wildlife and plants that depend on the river and are integral to the ways of life of the people of the Yukon. Wherever feasible, the Vision will be accomplished by protecting and restoring the natural ecological functions, habitats, and biological diversity of the Yukon River basin. Regaining a greater role in the governance and decision-making responsibilities in order to improve and protect the quality of the river is also a part of the Vision of the Tribes and First Nations.

Accomplishing the plan's vision is the ultimate purpose of the Watershed Plan, to which all other plan elements relate.


Alaska
Yukon
Yukon River Watershed
British Columbia
Norton Sound
Kotzebue Sound
Kuskokwim Bay
Cook Inlet
Gulf of
Anchorage
Fairbanks
Whitehorse
Juneau
0
200 Kilometers

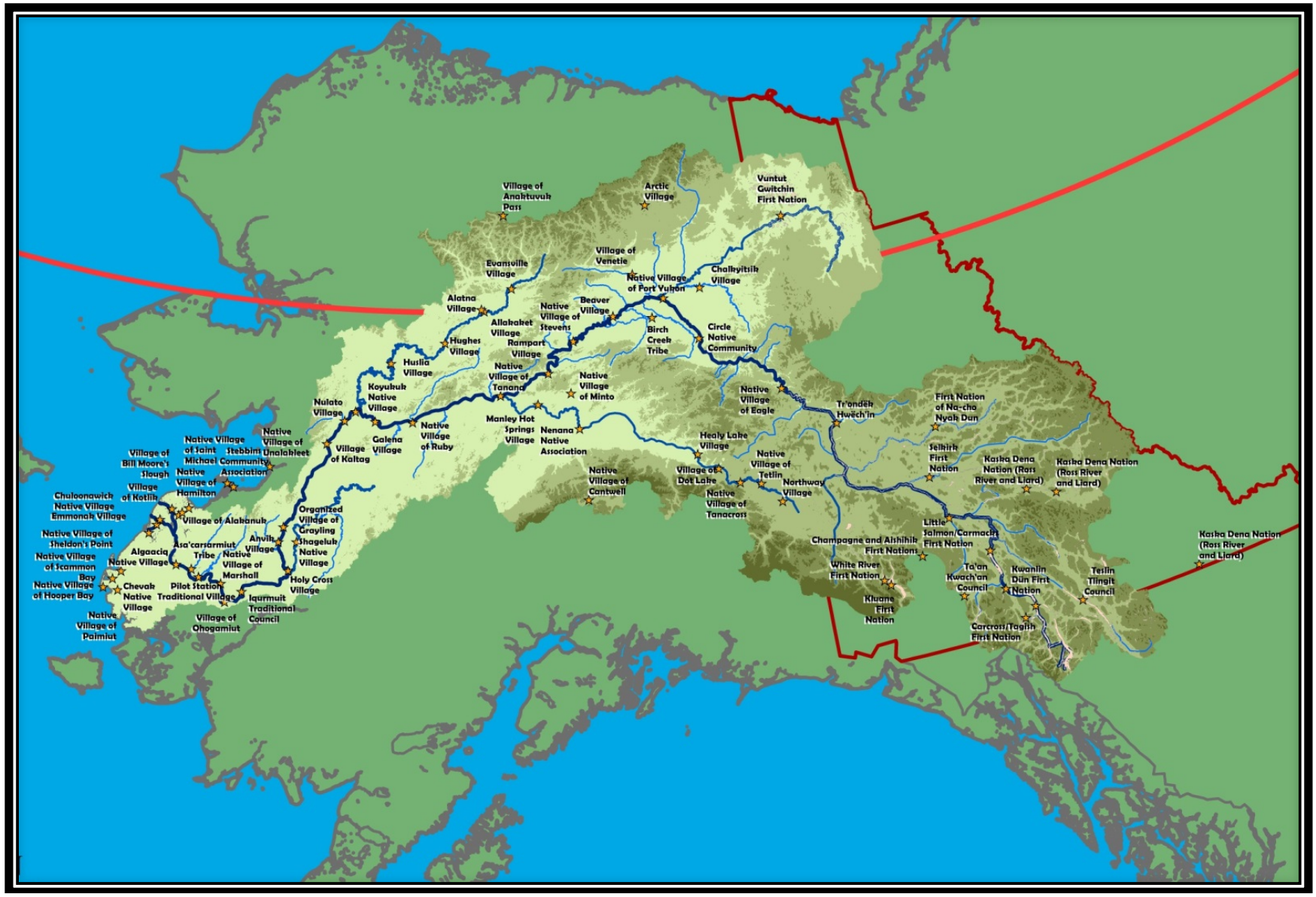

Figure 2. Signatory Map of the Yukon River Inter-Tribal Watershed Council

## Objectives

The **Objectives** of the plan describe the conditions of the river necessary to realize the plan's vision. The objectives are *qualitative* in nature, not specific and numerical:

- The Yukon River will be of such quality as to support and sustain the traditional and subsistence uses of the people of the First Nations and Tribes of the Yukon, including customary commercial uses.

- The Yukon River will be substantially unaltered from natural conditions in terms of quantity, quality and rate of flow, including seasonal and daily rates of flow and flow patterns, within normal environmental variation over time.

- The quality of the Yukon River will be consistent with, and support and sustain over time, the habitat characteristics and ecological functions necessary for abundant, productive and diverse populations of fish, wildlife and plants important to the Tribes and First Nations of the Yukon.

- The quality of the Yukon River will be consistent with, and support and sustain over time, the health of all the people, communities, and nations who drink or come into contact with the waters of the Yukon River.

Collectively the objectives promote and protect river flows and water quality for human health and fish and wildlife productivity, consistent with the vision. These objectives are also consistent with the water rights of the First Nations in Yukon and British Columbia as described in the Yukon Umbrella Final Agreement, with the premises and provisions of the Self-Government Agreements in Yukon, with the reserved water rights of the U.S. government under the Alaska Lands National Interest Lands Conservation Act, with the inherent water rights of the Tribes and First Nations of the Yukon River as sovereign governments within the U.S. and Canada, and as recognized in the United Nation's Declaration on the Rights of Indigenous Peoples. However, these objectives will be understood and expressed in different ways in the different legal jurisdictions within the watershed.

# Water Quality Standards

## Introduction

The centerpiece of the Yukon River Watershed Plan is a set of measurable, mostly quantitative **Water Quality Standards** that describe the quality of the water necessary to achieve the vision and objectives of the First Nations and Tribes. The purpose of these water quality standards is to improve and protect the chemical, physical, biological and cultural integrity of the surface waters of the Yukon River to promote the health, safety, welfare and well-being of the people of the Yukon River basin and to provide the conditions for healthy, productive, and abundant populations of fish, wildlife and plants dependent on the river.

The water quality standards in this umbrella plan provide baseline standards for the entire river, mainstem and tributaries. The Watershed Council also intends to facilitate local watershed planning efforts that may tailor these standards for certain contaminants in specific river reaches, still consistent with the plan's overarching vision and objectives. If local water quality standards are adopted by communities along the Yukon River, the standards in this umbrella plan will be revised accordingly. The Watershed Council will also seek continued review of these standards by the Tribes and First Nations, to ensure relevance and consistency with the traditional environmental knowledge of the people of the Yukon. And the Watershed Council will similarly seek independent technical review to ensure the both the river-wide standards and any local standards are scientifically sound.

Note that the water quality standards in this plan apply across the entirety of an international river. The Tribes and First Nations intend these standards to be consistent with the legal and regulatory regimes of the other sovereign governments relevant to the different parts of the river basin -- United States, State of Alaska, Canada, Yukon and British Columbia. The content of these water quality standards reflect the particular information and needs of the Yukon River, but they are grounded in and consistent with, in particular, the water quality rules and standards established under the U.S. Clean Water Act by the U.S. Environmental Protection Agency (EPA) and by the U.S. states and tribes delegated authority by EPA to develop standards. These standards are consistent with EPA regulations and guidelines and are largely drawn from the *best* of the water quality standards adopted by the states and tribes in the northwestern part of the United States, including Oregon, Washington, Alaska, the Confederated Salish and Kootenai Tribes, the Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes of the Umatilla Indian Reservation, the Spokane Tribe of Indians, the Puyallup Tribe of Indians, and the Port Gamble S'Kallam Tribe. The standards in the plan are also consistent with the responsibilities of the U.S. Department of the Interior to manage lands and reserved water rights in the Yukon River basin for purposes of water quality, fish and wildlife benefits, and rural subsistence under the Alaska National Interest Lands Conservation Act; with the responsibilities of the Alaska Departments of Environmental Conservation, Natural Resources, and Fish and Game to protect and improve water quality, instream flows and fish and wildlife habitat for similar purposes; and with other U.S. and state laws relating to water quality and fish and wildlife habitat.

Similarly, while no formal water quality regime exists in Canada that parallels the U.S. Clean Water Act, we drew from the detailed set of water quality guidelines of the Canadian Council of Ministers of the Environment (CCME), the inter-governmental forum comprised of the environment ministers from the federal, provincial and territorial governments. We also developed the plan's standards while cognizant of the legal and regulatory responsibilities of the Yukon and British Columbia governments relating to water quality, including compliance with the relevant provisions of the Yukon Waters Act, the Umbrella Final Agreement, the federal Fisheries Act, the Canadian Environmental Protection Act of 1999, the Yukon Environmental and Socio-Economic Assessment Act, and other federal and provincial laws relating to water quality and fish and wildlife habitat.

The water quality standards that follow are expressed numerically or in narrative, or both in some cases, and represent threshold levels of the different water quality characteristics that must be met in order to allow for and protect the uses of the Yukon River and its tributaries that support healthy and productive people and communities within the basin and the biological and physical processes necessary for productive populations of fish, wildlife and plants, consistent with the objectives of this plan. The uses of the water to be protected by these standards, consistent with the plan's vision and objectives, include contact for ceremonial and spiritual purposes; drinking, culinary and food processing activities; bathing, swimming, recreation and incidental contact during other activities on or near the water; commerce and navigation; the propagation, growth, migration, harvesting, and processing of native salmonids, other native fish and aquatic life, native wildlife species (birds, mammals, amphibians and reptiles), and important native plants; and the ordinary agricultural, commercial and industrial water supply purposes of the people and communities of the Yukon River basin.

**Water Quality Standards -- not to be exceeded in the surface waters of the Yukon River**

**General:** A central objective of the Watershed Plan is that the Yukon River be substantially unaltered from natural conditions in terms of quantity, quality and rate of flow, including seasonal and daily rates of flow and flow patterns, within normal environmental variation as that changes over time. All standards for specific characteristics are based in this Objective.

**Flow:** In the mainstem and tributaries, the Yukon River will be substantially unaltered from natural hydrographic conditions in terms of quantity, total and seasonal runoff, and rate of flow, including seasonal and daily rates of flow and flow patterns, within normal environmental variation that change over time. This is a display of the natural flow profile and range of average annual runoff:

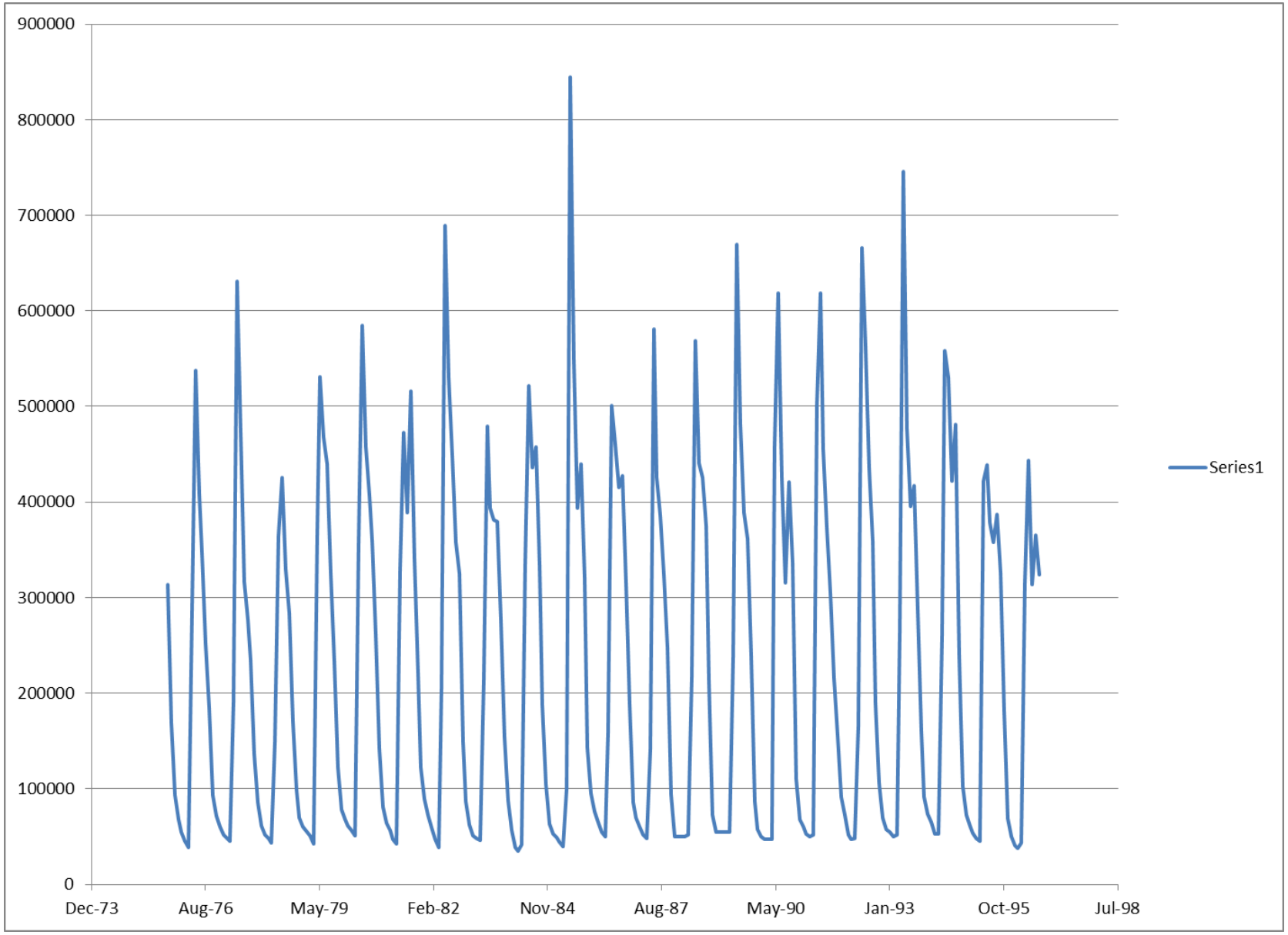


Figure 3. Historical flow regime at Pilot Station, AK (NWIS, USGS 2013).

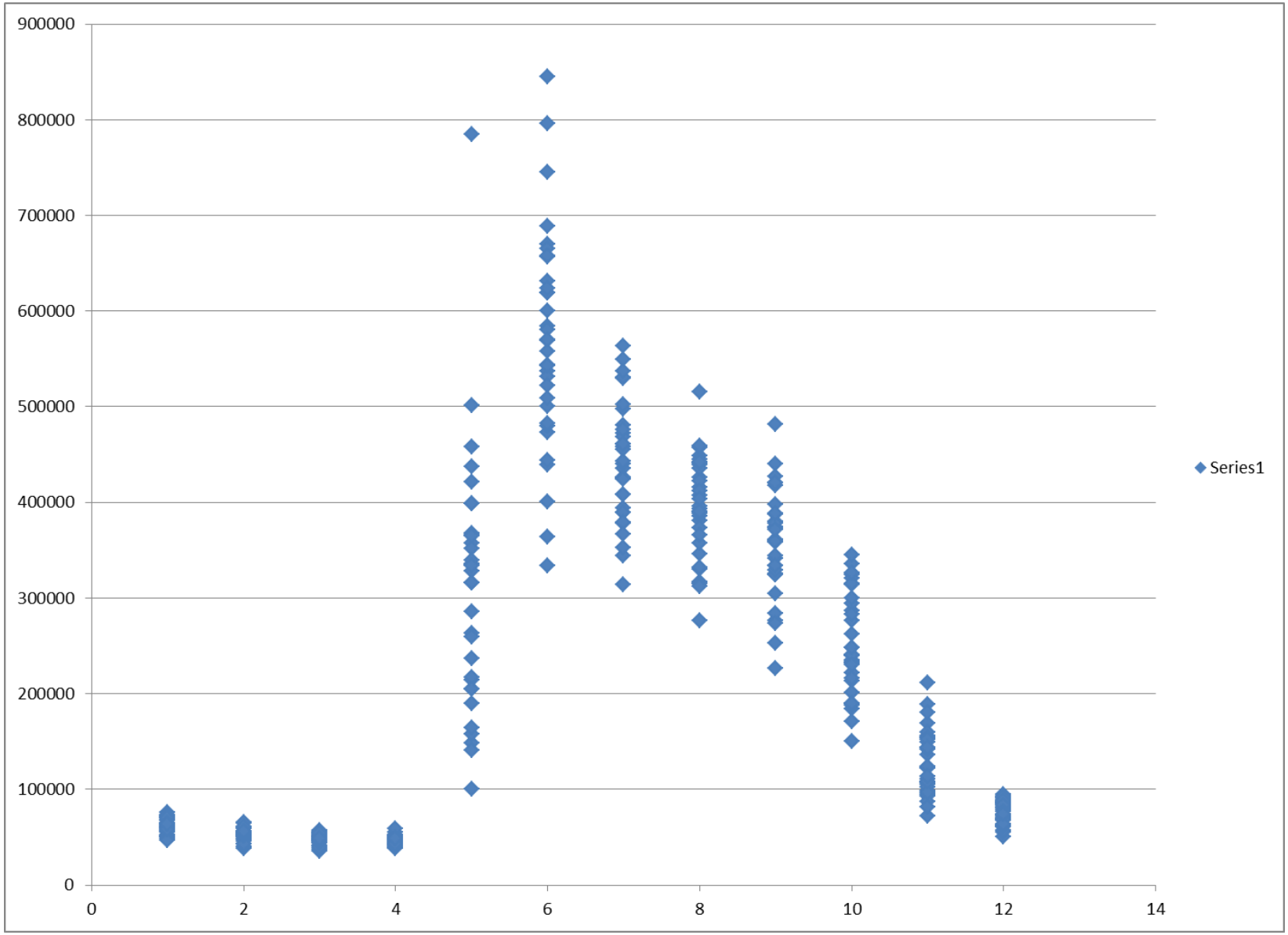

Figure 4. Historical flow variation at Pilot Station, AK.

The modest amount of flow regulation and withdrawals in the Yukon River existing as of 2012 is consistent with this standard. No further flow regulation or withdrawals of significance would be consistent with this standard in the absence of an amendment to this plan either altering the standard or recognizing the further changes as still consistent with the standard.

**Temperature:** The baseline standard is naturally occurring temperatures -- that is, the temperature standard is to avoid any measurable surface water temperature increase resulting from human activities. Local planning efforts may identify more specific temperature standards for specific river reaches, to be considered for adoption into the watershed plan upon sufficient documentation that the temperature standard is consistent with the designated uses. Even then, in no event shall a temperature standard allow temperatures to exceed a 7-day average of the daily maximum temperature values greater than 13°C in spawning and incubation areas and 15°C in rearing areas for key fish species.

**Dissolved Oxygen:**

In active spawning areas (and other areas identified later identified in local planning efforts), the seven-day mean minimum target level for total dissolved oxygen from spawning through fry emergence is to be at or above 11.0 mg/L. Even with that target, as long as the minimum intergravel dissolved oxygen concentration, measured as a spatial median, is determined to be 8.0 mg/L or greater, then the seven-day mean minimum dissolved oxygen standard for the waterbody as a whole may be as low as 9.0 mg/L but no lower. In any event, the spatial median intergravel dissolved oxygen concentration must not fall below 8.0 mg/L. ("Intergravel dissolved oxygen concentration" means the concentration of oxygen measured in the water within the stream bed gravels.) If conditions of barometric pressure, altitude, and temperature preclude attainment of either the 11.0 mg/L or 9.0 mg/L criteria, dissolved oxygen levels must not be less than 95 percent of saturation.

In all other areas of the river, all deemed suitable for cold-water aquatic life, under ordinary circumstances the total dissolved oxygen concentration may not be less than 8.0 mg/L. If conditions of barometric pressure, altitude, and temperature preclude attainment of the 8.0 mg/L, dissolved oxygen may not be less than 90 percent of saturation. On a case-by-case basis, upon demonstration that aquatic life will not be adversely affected, the dissolved oxygen standard in a particular stream reach may be revised so as to require that dissolved oxygen concentration not fall below 8.0 mg/L as a 30-day mean minimum, 6.5 mg/L as a seven-day minimum mean, and 6.0 mg/L as an absolute minimum.

**Fecal Coliform Bacteria:** In a 30-day period, the geometric mean may not exceed 20 colony-forming units/100 mL, and not more than 10% of the samples may exceed 40 colony-forming units/100 mL.

**Total Dissolved Solids (salinity):** Total dissolved solids from all sources may not exceed 250 mg/L.

**pH:** Human-induced variation of hydrogen ion concentration (pH) within the range of 6.5 to 8.5 must be less than 0.5 pH unit. Natural pH outside this range must be maintained without change. Natural pH above 7.0 must be maintained above 7.0.

**Radioactivity:** Human activity should not cause radioactive materials to be present in surface waters in excess of natural quantities. Specific numerical standards for radiological substances are guidelines for determining potential impairment:

| | |
|---|---|
| Gross alpha particle concentration | not exceed 15 picocuries/liter (pCi/L) |
| Gross beta particle concentration | not exceed 50 pCi/L -- 4 millirems annual dose equivalent |
| Radium 226 & 228 (combined) | not exceed 5 pCi/L |
| Radium 226 | not exceed 3 pCi/L |
| Strontium 90 | not exceed 8 pCi/L |
| Tritium | not exceed 20,000 pCi/L |
| Radon | not exceed 300 pCi/L |

**Turbidity:** No increase above naturally occurring turbidity so as to threaten or impair designated uses or aquatic biota. As a guideline to impairment, turbidity levels should not exceed 5 nephelometric turbidity units (NTU) above natural conditions when the natural turbidity is 50 NTU or less, and may not have more than 10% increase in turbidity when the natural turbidity is more than 50 NTU, not to exceed a maximum increase of 25 NTU.

**Residues (including petroleum hydrocarbons, oil and grease):** Residues are not allowed in surface waters in concentrations or amounts that impair designated uses, cause nuisance or objectionable conditions, result in undesirable or nuisance species, or produce objectionable odor or taste. All waters shall be free from visible oils, scum, foam, grease, and other floating and suspended substances resulting from other than natural causes. Residues from petroleum hydrocarbons, oil, and grease may not cause a visible sheen upon the surface of the water.

**Sediment:** No measurable increase in concentration of settleable solids above natural conditions. The formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, recreation, or industry is not allowed.

**Toxic substances**: Toxic substances may not be introduced above natural background levels in waters of the Yukon River basin in amounts, concentrations, or combinations that may be harmful, may chemically change to harmful forms in the environment, or may accumulate in sediments or bioaccumulate in aquatic life or wildlife to levels that adversely affect public health, safety, welfare, aquatic life, wildlife, or designated beneficial uses. This standard applies regardless of whether the toxicity is caused by a single substance or the additive or synergistic effect of multiple substances. Toxic substances include all substances that are persistent, carcinogenic, mutagenic, teratogenic, and/or bioaccumulate in concentrations producing detrimental physiological responses in human, plant, animal, or aquatic life, as determined by the most sensitive biota dependent upon those waters.

Table A (at the end of this section) provides a baseline set of specific numerical criteria for hundreds of toxic substances in the waters of the Yukon River to protect human health, aquatic life and drinking water. These criteria are a starting point for a quantitative expression of the narrative toxics standard above and of the general standard that Yukon River waters be substantially unimpaired in quality. The criteria in Table A are based in and derived from the most recent developments in toxic contaminant standards by the states and other tribes in the Pacific Northwest, with particular reliance on the recent adoption of strict human health criteria by the Oregon Department of Environmental Quality based in part on a more realistic assumption about fish consumption and on the more strict standards to protect salmonids and other aquatic fish developed over the last decade by a number of tribes in the Columbia River basin and supported by significant technical analysis. These numerical criteria should be considered the toxic contaminant standards to meet in Yukon River waters until further analysis in the Yukon basin itself. Further details are provided at Table A *below*.

**Mixing zone policy:** Under certain conditions a small portion of a stream may serve as a "mixing zone" of dilution for wastewaters, to allow the wastewaters and receiving waters to mix thoroughly. Within a mixing zone the water quality standards related to the pollutants in the wastewater may be exceeded but only under these conditions:

- Each proposed mixing zone and each allowed exceedance or lessening of water quality standards in a mixing zone must be reviewed and authorized on an individual case-by-case, pollutant-by-pollutant basis. The person or entity discharging the pollutant(s) must provide all the information necessary to demonstrate that a mixing zone will comply with this policy, even in periods of low flow within the historical record.

- A mixing zone should be the minimum size necessary.

- A mixing zone may not cause water quality standards to be exceeded or the water quality to be degraded outside the mixing zone.

- Mixing zones may not interfere with or threaten beneficial uses of the stream.

- Mixing zones may not interfere with or endanger public health.

- Mixing zones are not allowed adjacent to or immediately above drinking water intakes, and may not affect drinking water intakes in any way.

- A mixing zone should have no effect on and cause no significant reduction in the survival, productivity, or population levels of aquatic or terrestrial organisms. Mixing zones are not allowed in or immediately above stream areas identified as used by anadromous fish or important species of resident fish for spawning, incubation, rearing or resting. Nor should a mixing zone be a barrier or a hindrance to the passage or movement of fish or other migratory species. And a mixing zone will not be allowed if it would adversely affect the future capability of a stream to support spawning, incubation, rearing, or resting of anadromous fish or key resident fish populations.

- A mixing zone shall be free from substances that settle to form objectionable objects; float as debris, scum, oil, or other nuisance matter; produce objectionable color, odor, taste, or turbidity; are acutely toxic; or produce undesirable or nuisance aquatic life.

- No discharges into mixing zones shall be permitted for pollutants which have the potential to settle, persist, bioaccumulate or bioconcentrate in the mixing zone or in the aquatic environment.

- Mixing zones are not allowed if they would significantly affect cultural, economic or recreational activities on nearby lands or waters.

- A mixing zone should not be relied upon as a substitute for wastewater treatment and control. All discharges must comply with all applicable treatment requirements in law and regulation.

- Conclusions, decisions and conditions applied to approve a mixing zone are subject to review and revision as further information related to the permitted mixing zone becomes available.

**Anti-degradation policy:** The objective of the Tribes and First Nations in this plan -- an objective also expressed in the general water quality standard that begins this section as well as in the rights and expectations of the individual Tribes and First Nations -- is that Yukon River be *substantially unaltered from natural conditions* in terms of quantity, *quality* and rate of flow, within normal environmental variation. This means the objective of this water quality plan is itself a statement of an anti-degradation policy, as the norm to expect across the entirety of the Yukon River basin.

This is the reason the specific water quality standards in this plan are as strict as they are -- as an expression of quality not to be substantially altered or impaired or degraded. The water quality standards and the principle of anti-degradation are to be read together, as a consistent approach to the quality of the water of the Yukon River. Among other things this means that all existing and proposed land and water activities should be evaluated as to whether they pose a threat to meeting the water quality standards -- and thus pose a threat to the degradation of the Yukon -- and if so, the degrading activities should be addressed (changed or ceased or conditioned or denied) to ensure the river's water quality is not substantially degraded.

For this reason the water quality standards in this plan do not include a complex anti-degradation policy, as is often the case in water quality standards under the U.S. Clean Water Act. Water quality in the Yukon River should be maintained, not degraded, and improved where below standards. The Tribes and First Nations of the Yukon River approve this plan with the understanding that in certain circumstances a decision may be made, on appropriate information, to allow a land or water activity that will promote important economic or social objectives in the region but will slightly impair water quality. Such decisions should be rare, and the Tribes and First Nations must participate in the decisionmaking. And in no event may degradation of Yukon River waters violate the specific water quality standards or interfere with or be harmful to public health or welfare, cultural and spiritual activities and values, fish and wildlife health, the health of domestic animals, or any other existing or designated uses.

The central point of having water quality standards is to ensure that these standards are met and not violated in the waters of the Yukon River basin. If monitoring identifies waters that violate the standards, human-caused problems contributing to the violations should be identified and addressed and the standards attained. (Circumstances in which natural conditions exceed a standard in a certain river reach are consistent with the standards.) It is likely, however, that monitoring will determine that the quality of the waters of the Yukon River basin is, in most cases and places, *better* than these water quality standards. That is the reason for this anti-degradation policy. Degrading to the standard in such circumstances is not the preferred approach; protecting the water quality so that it can be said to remain substantially unaltered as to its quality is the policy.

**Additional habitat standards to support fish spawning, rearing, resting and migration:** The standards above for flow, temperature, dissolved oxygen, and toxic contaminants are critical for productive habitat for fish. There are a handful of other habitat characteristics that are important for productive fish habitat, such as characteristics relating to channel structure, macro-invertebrates, food webs, gravel size and movement, and so forth. The Watershed Council will work with the expertise of fish biologists, ecologists and fisheries managers and the traditional environmental knowledge of the people of the Yukon River basin to develop a set of habitat standards of this type for this purpose. Gathering and organizing information for this purpose still needs to occur before the Watershed Council staff is able to assess the information and recommend standards beyond those in this plan. It may be possible to develop a few standards of this type for the entire basin, but most likely habitat standards of this type will need to be tailored to particular locations as a product of local planning described elsewhere in this plan, identifying the water quality and other habitat characteristics necessary to support the productivity of the habitat for the specific life-stage use of that stretch of the river (e.g., spawning and emergence or rearing or migration).

# Table A
# Toxic Contaminant Criteria for Human Health, Aquatic Life and Water Supply

Table A provides a baseline set of specific numerical criteria for hundreds of toxic substances in the waters of the Yukon River to protect human health, aquatic life and drinking water. These criteria should be considered as the starting point for a quantitative expression of the narrative toxic contaminant standard and of the general standard that Yukon River waters be substantially unimpaired in quality. The criteria in Table A are based in and derived from the most recent developments in toxic contaminant standards by the states and other tribes in the Pacific Northwest, with particular reliance on the recent adoption of strict human health criteria by the Oregon Department of Environmental Quality based in part on a more realistic assumption about fish consumption and on the more strict standards to protect salmonids and other aquatic fish developed over the last decade by a number of tribes in the Columbia River basin and supported by significant technical analysis. These numerical criteria should be considered the toxic contaminant standards to meet in Yukon River waters until further analysis in the Yukon basin itself. For more details on these criteria:

*Human Health Criteria*. The human health criteria Table A are intended to protect people from potential adverse health effects associated with long-term exposure to toxic substances associated with consumption of water, fish, other aquatic life, aquatic and riparian plants, and wildlife dependent on or connected with the river. The "organism only" criteria are established to protect people when consuming fish or other aquatic life. The "water + organism" criteria are established to protect the consumption of drinking water, fish, and shellfish, and apply where domestic water supply (public and private) is also a designated use. All criteria are expressed as micrograms per liter (µg/L), unless otherwise noted. Pollutants are listed in alphabetical order. Additional information includes the Chemical Abstract Service (CAS) number, and whether (in certain cases) the criterion is based on carcinogenic effects (can cause cancer in humans). Unless otherwise noted, all human health criteria were calculated by the Oregon Department of Environmental Quality using a revised fish consumption rate of 175 grams per day, which may still be low for the people of the Yukon basin. A fish consumption rate of 175 grams per day is approximately equal to 23 8-ounce fish meals per month. For pollutants categorized as carcinogens, values represent a cancer risk of one additional case of cancer in one million people (i.e. 10-6), unless otherwise noted. The 2011 Annual Report on Carcinogens, developed by the National Toxicology Program of the U.S. Department of Health and Human Services was used as a reference for determining carcinogenicity.

*Aquatic Life Criteria.* Table A also provides criteria for levels or concentrations of toxic substances not to be exceeded in the Yukon River to protect aquatic life. All values are expressed as micrograms per liter (µg/L) except where noted. The acute criteria refer to the average concentration for one hour. The chronic criteria refer to the average concentration for 96 hours (4 days), and should not be exceeded more than once every three (3) years.

*Water Supply Maximum Contaminant Level.* Finally, Table A expresses a water quality standard in the river for certain contaminants in terms of a maximum contaminant level for

drinking water supply. These values are included only when specific "organism" and "water+organism" standards have yet to be determined and yet there is a threat to human health from the contaminant primarily through drinking water or when (in a few cases) safe drinking water criteria adds an additional measure of protection to "organism" and "water+organism" based standards. All values in this category are expressed as micrograms per liter (µg/L), and are largely derived from criteria developed by the U.S. EPA under the Safe Drinking Water Act. The absence of a value in this category for any contaminant does not mean there is no maximum contaminant level in drinking water for this contaminant, only that the drinking water criteria is supplanted as a water quality standard for the river as a whole by values determined for the other categories.

Table A begins on the next page.

# Table A
# Toxic Contaminant Criteria for Human Health, Aquatic Life and Water Supply

| No. | Pollutant | CAS No. | Carcinogen | Human Health Criteria: *Water + Organism (µg/L)* | Human Health Criteria: *Organism Only (µg/L)* | Aquatic Life Acute Criteria *(µg/L)* | Aquatic Life Chronic Criteria *(µg/L)* | Water Supply Maximum Contaminant Level *(µg/L)* |
|---|---|---|---|---|---|---|---|---|
| 1 | Acenaphthene | 83329 | n | 95 | 99 | | | |
| 2 | Acrolein | 107028 | n | 0.88 | 0.93 | | | |
| 3 | Acrylonitrile | 107131 | y | 0.018 | 0.025 | | | |
| 4 | Alachor | 15972608 | | | | | | 2 |
| 5 | Aldicarb | 116063 | | | | | | 3 |
| 6 | Aldicarb Sulfone | 1646884 | | | | | | 2 |
| 7 | Aldicarb Sulfoxide | 1646873 | | | | | | 4 |
| 8 | Aldrin | 309002 | y | 0.0000050 | 0.0000050 | 3 | 1.3 | |
| 9 | Alkalinity | | | | | | 20,000 | |
| *The alkalinity standard is a minimum, not a maximum.* | | | | | | | | |
| 10 | Aluminum | 7429905 | | | | 750 | 87 | 50-200 [pH dependent] |
| 11 | Ammonia | 7664417 | | | | *Aquatic life criteria are pH and temperature dependent (see EPA ambient criteria tables)* | | |
| 12 | Anthracene | 120127 | n | 2900 | 4000 | | | |
| 13 | Antimony | 7440360 | n | 5.1 | 64 | | | 6 |
| 14 | Arsenic | 7440382 | y | 0.018 | 0.14 | 340 | 150 | |
| *The human health arsenic criteria apply to total inorganic arsenic only, and are based on a carcinogenic risk level of 1 x 10-6. The aquatic life criteria applies to total arsenic.* | | | | | | | | |
| 15 | Asbestos | 1332214 | y | 7,000,000 fibers/L | | | | 7,000,000 fibers/L |
| *The human health risks from asbestos are primarily from drinking water. Therefore no "organism only" criterion was developed, and the "water + organism" criterion is based on the maximum contaminant level established for drinking water supply.* | | | | | | | | |

| No. | Pollutant | CAS No. | Carcinogen | Human Health Criteria: *Water + Organism (µg/L)* | Human Health Criteria: *Organism Only (µg/L)* | Aquatic Life Acute Criteria *(µg/L)* | Aquatic Life Chronic Criteria *(µg/L)* | Water Supply Maximum Contaminant Level *(µg/L)* |
|---|---|---|---|---|---|---|---|---|
| 16 | Atrazine | 1912249 | | | | | | 3 |
| 17 | Barium | 7440393 | n | 1000 | | | | 1000 |
| *Human health risks from barium are primarily from drinking water. Therefore no "organism only" criterion was developed, and the "water + organism" criterion is based in the maximum contaminant level established for drinking water supply and does not utilize the "fish consumption rate" approach.* | | | | | | | | |
| 18 | Benz(a)anthracene | 56553 | y | 0.0013 | 0.0018 | | | |
| 19 | Benzidine | 92875 | y | 0.000018 | 0.000020 | | | |
| 20 | Benzo(a)pyrene | 50328 | y | 0.0013 | 0.0018 | | | |
| 21 | Benzo(b)fluoranthene 3,4 | 205992 | y | 0.0013 | 0.0018 | | | |
| 22 | Benzo(k)fluoranthene | 207089 | y | 0.0013 | 0.0018 | | | |
| 23 | Beryllium | 7440417 | | | | | | 4 |
| 24 | BHC alpha | 319846 | y | 0.00045 | 0.00049 | | | |
| 25 | BHC beta | 319857 | y | 0.0016 | 0.0017 | | | |
| 26 | BHC gamma (Lindane) | 58899 | n | 0.17 | 0.18 | 0.95 | 0.08 | |
| 27 | Bromate | 15541454 | | | | | | 10 |
| 28 | Bromoform | 75252 | y | 3.3 | 14 | | | |
| 29 | Butylbenzyl phthalate | 85687 | n | 190 | 190 | | | |
| 30 | Cadmium | 7440439 | | | | 2.0 | 0.25 | 5 |
| *The freshwater aquatic life criteria for cadmium are hardness dependent (100 mg/L used).* | | | | | | | | |
| 31 | Carbofuran | 1563662 | | | | | | 40 |
| 32 | Carbon tetrachloride | 56235 | y | 0.10 | 0.16 | | | |
| 33 | Chlordane | 57749 | y | 0.000081 | 0.000081 | 2.4 | 0.0043 | |
| 34 | Chloride | 16887006 | | | | 860,000 | 230,000 | |
| 35 | Chlorine | 7782505 | | | | 19 | 11 | |
| 36 | Chlorite | | | | | | | 1000 |
| 37 | Chlorobenzene | 108907 | n | 74 | 160 | | | |
| 38 | Chlorodibromomethane | 124481 | y | 0.31 | 1.3 | | | |
| 39 | Chloroethyl ether bis2 | 111444 | y | 0.020 | 0.05 | | | |

| No. | Pollutant | CAS No. | Carcinogen | Human Health Criteria: *Water + Organism (µg/L)* | Human Health Criteria: *Organism Only (µg/L)* | Aquatic Life Acute Criteria *(µg/L)* | Aquatic Life Chronic Criteria *(µg/L)* | Water Supply Maximum Contaminant Level *(µg/L)* |
|---|---|---|---|---|---|---|---|---|
| 40 | Chloroform | 67663 | n | 5.7 | 470 | | | |
| 41 | Chloroisopropyl ether bis 2 | 108601 | n | 1200 | 6500 | | | |
| 42 | Chloromethyl ether, bis | 542881 | y | 0.000024 | 0.000029 | | | |
| 43 | Chloronaphthalene 2 | 91587 | n | 150 | 160 | | | |
| 44 | Chlorophenol 2 | 95578 | n | 14 | 15 | | | |
| 45 | Chlorpyrifos | 2921882 | | | | 0.083 | 0.041 | |
| 46 | Chromium (hex) | 18540299 | | | | 16 | 11 | |
| 47 | Chromium (tri) | | | | | 570 | 74 | |
| *The freshwater aquatic life criteria for chromium (tri) are hardness dependent (100 mg/L used).* | | | | | | | | |
| 48 | Chromium (total) | | | | | | | 100 |
| 49 | Chrysene | 218019 | y | 0.0013 | 0.0018 | | | |
| 50 | Copper | 7440508 | n | 1300 | | 13 | 9 | 1300 |
| *Human health risks from copper are primarily from drinking water. Therefore no "organism only" criterion was developed, and the "water + organism" criterion is based in the maximum contaminant level established for drinking water supply and does not utilize the "fish consumption rate" approach. The freshwater aquatic life criteria for copper are hardness dependent (100 mg/L used)* | | | | | | | | |
| 51 | Cyanide | 57125 | n | 130 | 130 | 22 | 5.2 | |
| *The cyanide criteria are expressed as total cyanide (CN)/L.* | | | | | | | | |
| 52 | Dalapon | 75990 | | | | | | 200 |
| 53 | DDD 4,4' | 72548 | y | 0.000031 | 0.000031 | | | |
| 54 | DDE 4,4' | 72559 | y | 0.000022 | 0.000022 | | | |
| 55 | DDT 4,4' | 50293 | y | 0.000022 | 0.000022 | 1.1 | 0.001 | |
| 56 | Demeton | 8065483 | | | | | 0.1 | |
| 57 | Di(2-ethylhexyl) adipate | 103231 | | | | | | 400 |
| 58 | Di(2-ethylhexyl) phthalate | 117817 | | | | | | 6 |
| 59 | Diazinon | 333415 | | | | 0.17 | 0.17 | |
| 60 | Dibenzo(a,h)anthracene | 53703 | y | 0.0013 | 0.0018 | | | |

| No. | Pollutant | CAS No. | Carcinogen | Human Health Criteria: *Water + Organism (µg/L)* | Human Health Criteria: *Organism Only (µg/L)* | Aquatic Life Acute Criteria *(µg/L)* | Aquatic Life Chronic Criteria *(µg/L)* | Water Supply Maximum Contaminant Level *(µg/L)* |
|---|---|---|---|---|---|---|---|---|
| 61 | Dibromochloropropane | 96128 | | | | | | 0.2 |
| 62 | Dichlorobenzene(m) 1,3 | 541731 | n | 80 | 96 | | | |
| 63 | Dichlorobenzene(o) 1,2 | 95501 | n | 110 | 130 | | | |
| 64 | Dichlorobenzene(p) 1,4 | 106467 | n | 16 | 19 | | | |
| 65 | Dichlorobenzidine 3,3' | 91941 | y | 0.0027 | 0.0028 | | | |
| 66 | Dichlorobromomethane | 75274 | y | 0.42 | 1.7 | | | |
| 67 | Dichloroethane 1,2 | 107062 | y | 0.35 | 3.7 | | | |
| 68 | Dichloroethylene 1,1 | 75354 | n | 230 | 710 | | | 7 |
| 69 | Dichloroethylene cis 1,2 | 156592 | | | | | | 70 |
| 70 | Dichloroethylene trans 1,2 | 156605 | n | 120 | 1000 | | | 100 |
| 71 | Dichlorophenol 2,4 | 120832 | n | 23 | 29 | | | |
| 72 | Dichlorophenoxyacetic acid 2,4- (chlorophenoxy herbicide 2,4-D) | 94757 | | 100 | | | | 70 |
| *Human health risks from dichlorophenoxyacetic acid 2,4- (2,4-D) are primarily from drinking water. Therefore no "organism only" criterion has been developed, and the "water + organism" criterion is based in the maximum contaminant level established for drinking water supply and does not utilize the "fish consumption rate" approach.* | | | | | | | | |
| 73 | Dichloropropane 1,2 | 78875 | y | 0.38 | 1.5 | | | |
| 74 | Dichloropropene 1,3 | 542756 | y | 0.30 | 2.1 | | | |
| 75 | Dieldrin | 60571 | y | 0.0000053 | 0.0000054 | 0.24 | 0.0019 | |
| 76 | Diethyl phthalate | 84662 | n | 3800 | 4400 | | | |
| 77 | Dimethyl phthalate | 131113 | n | 84,000 | 110,000 | | | |
| 78 | Dimethylphenol 2,4 | 105679 | n | 76 | 85 | | | |
| 79 | Di-n-butyl phthalate | 84742 | n | 400 | 450 | | | |
| 80 | Dinitrophenol 2,4 | 51285 | n | 62 | 530 | | | |
| 81 | Dinitrophenols | 25550587 | n | 62 | 530 | | | |
| 82 | Dinitrotoluene 2,4 | 121142 | y | 0.084 | 0.34 | | | |

| No. | Pollutant | CAS No. | Carcinogen | Human Health Criteria: *Water + Organism (µg/L)* | Human Health Criteria: *Organism Only (µg/L)* | Aquatic Life Acute Criteria *(µg/L)* | Aquatic Life Chronic Criteria *(µg/L)* | Water Supply Maximum Contaminant Level *(µg/L)* |
|---|---|---|---|---|---|---|---|---|
| 83 | Dinoseb | 88857 | | | | | | 7 |
| 84 | Dioxin (2,3,7,8-TCDD) | 1746016 | y | 0.00000000051 | 0.00000000051 | | | |
| 85 | Diphenylhydrazine 1,2 | 122667 | y | 0.014 | 0.020 | | | |
| 86 | Diquat | 85007 | | | | | | 20 |
| 87 | Endosulfan | | | | | 0.22 | 0.056 | |
| 88 | Endosulfan alpha | 959988 | n | 8.5 | 8.9 | 0.22 | 0.056 | |
| 89 | Endosulfan beta | 33213659 | n | 8.5 | 8.9 | 0.22 | 0.056 | |
| 90 | Endosulfan sulfate | 1031078 | n | 8.5 | 8.9 | | | |
| 91 | Endothall | 145733 | | | | | | 100 |
| 92 | Endrin | 72208 | n | 0.024 | 0.024 | 0.086 | 0.0023 | |
| 93 | Endrin aldehyde | 7421934 | n | 0.030 | 0.030 | | | |
| 94 | Ethylbenzene | 100414 | n | 160 | 210 | | | |
| 95 | Ethylene dibromide (EDB) | 106934 | | | | | | 0.05 |
| 96 | Ethylhexyl phthalate bis 2 | 117817 | y | 0.20 | 0.22 | | | |
| 97 | Fluoranthene | 206440 | n | 14 | 14 | | | |
| 98 | Fluorene | 86737 | n | 390 | 530 | | | |
| 99 | Fluoride | 7782414 | | | | | | 4000 |
| 100 | Glyphosate | 1071836 | | | | | | 700 |
| 101 | Guthion | | | | | | 0.01 | |
| 102 | Halocetic acids (HAA5) | | | | | | | 60 |
| 103 | Heptachlor | 76448 | y | 0.0000079 | 0.0000079 | 0.52 | 0.0038 | |
| 104 | Heptachlor epoxide | 1024573 | y | 0.0000039 | 0.0000039 | 0.52 | 0.0038 | |
| 105 | Hexachlorobenzene | 118741 | y | 0.000029 | 0.000029 | | | |
| 106 | Hexachlorobutadiene | 87683 | y | 0.36 | 1.8 | | | |
| 107 | Hexachlorocyclo-hexane-technical | 608731 | y | 0.0014 | 0.0015 | | | |

| No. | Pollutant | CAS No. | Carcinogen | Human Health Criteria: *Water + Organism (µg/L)* | Human Health Criteria: *Organism Only (µg/L)* | Aquatic Life Acute Criteria *(µg/L)* | Aquatic Life Chronic Criteria *(µg/L)* | Water Supply Maximum Contaminant Level *(µg/L)* |
|---|---|---|---|---|---|---|---|---|
| 108 | Hexachloro-cyclopentadiene | 77474 | n | 30 | 110 | | 240 | |
| 109 | Hexachloroethane | 67721 | y | 0.29 | 0.33 | | | |
| 110 | Indeno(1,2,3-cd) pyrene | 193395 | y | 0.0013 | 0.0018 | | | |
| 111 | Iron | 7439896 | | 300 | | | 1000 | 300 |
| *The "water + organism" criterion is based in the maximum contaminant level established for drinking water supply and does not utilize the "fish consumption rate" approach.* | | | | | | | | |
| 112 | Isophorone | 78591 | y | 27 | 96 | | | |
| 113 | Lead | 7439921 | | | | 65 | 2.5 | 15 |
| *The freshwater aquatic life criteria for lead are hardness dependent (100 mg/L used).* | | | | | | | | |
| 114 | Malathion | 121755 | | | | | 0.1 | |
| 115 | Manganese | 7439965 | n | 50 | 100 | | | |
| *The "organism only" human health criterion for manganese is for total manganese and relevant to salt water only. The value is derived from U.S. EPA reports that predate and do not utilize the "fish consumption rate" approach.* | | | | | | | | |
| 116 | Mercury | 7439976 | | 0.05 | 0.05 | 1.4 | 0.012 | |
| 117 | Methoxychlor | 72435 | n | 100 | | | 0.03 | 40 |
| *Human health risks from methoxychlor are primarily from drinking water. Therefore no "organism only" criterion has been developed, and the "water + organism" criterion is based in the maximum contaminant level established for drinking water supply and does not utilize the "fish consumption rate" approach.* | | | | | | | | |
| 118 | Methyl bromide | 74839 | n | 37 | 150 | | | |
| 98 | Methyl-4,6-dinitrophenol 2 | 534521 | n | 9.2 | 28 | | | |
| 119 | Methylene chloride (dichloromethane) | 75092 | y | 4.3 | 59 | | | 5 |
| 120 | Methylmercury | 22967926 | n | | 0.040 mg/kg | | | |
| *The human health criterion for methylmercury is expressed as the fish tissue concentration of methylmercury, in mg/kg. Contaminated fish and shellfish is the primary route for human exposure to methylmercury* | | | | | | | | |
| 121 | Mirex | 2385855 | | | | | 0.001 | |
| 122 | Monochlorobenzene | 108907 | | | | | | 100 |

| No. | Pollutant | CAS No. | Carcinogen | Human Health Criteria: *Water + Organism (µg/L)* | Human Health Criteria: *Organism Only (µg/L)* | Aquatic Life Acute Criteria *(µg/L)* | Aquatic Life Chronic Criteria *(µg/L)* | Water Supply Maximum Contaminant Level *(µg/L)* |
|---|---|---|---|---|---|---|---|---|
| 123 | Nickel | 7440020 | n | 140 | 170 | 470 | 52 | 100 |
| *The freshwater aquatic life criteria for nickel are hardness dependent (100 mg/L used).* | | | | | | | | |
| 124 | Nitrates | 14797558 | n | | | | | 10,000 |
| 125 | Nitrite | 14797650 | | | | | | 1000 |
| 126 | Nitrates and Nitrite total | | | | | | | 10,000 |
| 127 | Nitrobenzene | 98953 | n | 14 | 69 | | | |
| 128 | Nitrosamines | 35576911 | y | 0.00079 | 0.046 | | | |
| 129 | Nitrosodibutylamine, N | 924163 | y | 0.0050 | 0.022 | | | |
| 130 | Nitrosodiethylamine, N | 55185 | y | 0.00079 | 0.046 | | | |
| 131 | Nitrosodimethylamine, N | 62759 | y | 0.00068 | 0.30 | | | |
| 132 | Nitrosodi-n-propylamine, N | 621647 | y | 0.0046 | 0.051 | | | |
| 133 | Nitrosodiphenylamine, N | 86306 | y | 0.55 | 0.60 | | | |
| 134 | Nitrosopyrrolidine, N | 930552 | y | 0.016 | 3.4 | | | |
| 135 | Nonylphenol | 1044051 | | | | 28 | 6.6 | |
| 136 | Oxamyl (Vydate) | 23135220 | | | | | | 200 |
| 137 | Parathion | 56382 | | | | 0.065 | 0.013 | |
| 138 | Pentachlorobenzene | 608935 | n | 0.15 | 0.15 | | | |
| 139 | Pentachlorophenol | 87865 | y | 0.15 | 0.30 | 19 | 13 | |
| *The freshwater aquatic life criteria for pentachlorophenol are pH dependent (7.8 pH used).* | | | | | | | | |
| 140 | Phenol | 108952 | n | 9400 | 86,000 | | | |
| 141 | Phosphorus elemental | 7723140 | | | | | 0.1 | |
| 142 | Picloram | 1918021 | | | | | | 500 |
| 143 | Polychlorinated biphenyls (PCBs) | NA | y | 0.0000064 | 0.0000064 | 2 | 0.014 | |
| *The human health criteria for PCBs apply as total PCBs (e.g. determined as Aroclors or congeners)* | | | | | | | | |

| No. | Pollutant | CAS No. | Carcinogen | Human Health Criteria: *Water + Organism (µg/L)* | Human Health Criteria: *Organism Only (µg/L)* | Aquatic Life Acute Criteria *(µg/L)* | Aquatic Life Chronic Criteria *(µg/L)* | Water Supply Maximum Contaminant Level *(µg/L)* |
|---|---|---|---|---|---|---|---|---|
| 144 | Pyrene | 129000 | n | 290 | 400 | | | |
| 145 | Selenium | 7782492 | n | 120 | 420 | 186/13 | 5.0 | 50 |
| *The freshwater aquatic life acute criterion for selenium is represented by the amounts of total selenium that are selenite and selenate, respectively.* | | | | | | | | |
| 146 | Silver | 7440224 | | | | 3.2 | 0.12 | |
| *The freshwater aquatic life criteria for silver are hardness dependent (100 mg/L used).* | | | | | | | | |
| 147 | Simazine | 122349 | | | | | | 4 |
| 148 | Styrene | 100425 | | | | | | 100 |
| 149 | Sulfide hydrogen sulfide | 7783064 | | | | | 2 | |
| 150 | Tetrachlorobenzene, 1,2,4,5- | 95943 | n | 0.11 | 0.11 | | | |
| 151 | Tetrachloroethane 1,1,2,2 | 79345 | y | 0.12 | 0.40 | | | |
| 152 | Tetrachloroethylene | 127184 | y | 0.24 | 0.33 | | | |
| 153 | Thallium | 7440280 | n | 0.043 | 0.047 | | | |
| 154 | Toluene | 108883 | n | 720 | 1500 | | | 1000 |
| 155 | Toxaphene | 8001352 | y | 0.000028 | 0.000028 | 0.73 | 0.0002 | |
| 156 | Tributyltin TBT | | | | | 0.46 | 0.063 | |
| 157 | Trichlorobenzene 1,2,4 | 120821 | n | 6.4 | 7.0 | | | |
| 158 | Trichloroethane 1,1,1 | 71556 | | | | | | 200 |
| 159 | Trichloroethane 1,1,2 | 79005 | y | 0.44 | 1.6 | | | |
| 160 | Trichloroethylene | 79016 | y | 1.4 | 3.0 | | | |
| 161 | Trichlorophenol 2,4,6 | 88062 | y | 0.23 | 0.24 | | | |
| 162 | Trichlorophenol, 2,4,5- | 95954 | n | 330 | 360 | | | |
| 163 | Trichlorophenoxy 2,4,5- (propionic acid; 2,4,5-TP) | 93721 | | 10 | | | | |
| *Human health risks from trichlorophenoxy 2,4,5- (2,4,5,-TP) are primarily from drinking water. Therefore no "organism only" criterion was developed, and the "water + organism" criterion is based in the maximum contaminant level established for drinking water supply and does not utilize the "fish consumption rate"* | | | | | | | | |

| No. | Pollutant | CAS No. | Carcinogen | Human Health Criteria: *Water + Organism (µg/L)* | Human Health Criteria: *Organism Only (µg/L)* | Aquatic Life Acute Criteria *(µg/L)* | Aquatic Life Chronic Criteria *(µg/L)* | Water Supply Maximum Contaminant Level *(µg/L)* |
|---|---|---|---|---|---|---|---|---|
| *approach.* | | | | | | | | |
| 164 | Trihalomethanes (TTHMs) total | | | | | | | 80 |
| *TTHMs are the sum of the concentrations of bromodichloromethane, dibromochloromethane, tribromomethane (bromoform), and trichloromethane (chloroform).* | | | | | | | | |
| 165 | Uranium | 7440611 | | | | | | 30 |
| 166 | Vinyl chloride | 75014 | y | 0.023 | 0.24 | | | |
| 167 | Xylenes (total) | 1330207 | | | | | | 10,000 |
| 168 | Zinc | 7440666 | n | 2100 | 2600 | 120 | 110 | |
| *The freshwater aquatic life criteria for zinc are hardness dependent (100 mg/L used).* | | | | | | | | |

## Actions

Water quality standards are an important initial step toward protecting the quality of the water to meet the vision and objectives of the Tribes and First Nations. And the plan's objectives and baseline standards alone are sufficient to begin discussions with the other governments about implementation and river governance (*see* next section). At the same time, the Watershed Council's Watershed Plan will eventually combine water quality standards with a set of **Actions** intended to (1) continue and extend the Watershed Council's monitoring of the quality of the river's water, and assess against the standards, (2) identify existing or potential threats to the standards, and (3) protect or improve the quality of the water in order to meet the water quality standards.

To a certain extent these kinds of actions will emerge from local and reach-specific planning efforts that will identify specific threats to water quality and the necessary responses to those threats, consistent with this basinwide or "umbrella" plan and its water quality standards. Making the transition from basinwide water quality standards to local actions will require a sophisticated, on-going technical assessment and policy effort. Thus the plan begins an ongoing effort to identify and address the threats to the water quality of the Yukon River, including the adverse effects of mining, transportation, municipal development, and abandoned mining and military sites.

**Assessing the current state of the river's water quality against the water quality standards, identifying both where the water quality now meets or exceeds the standards and where there are gaps between the standards and current water quality.** The Watershed Council and its partners have been accumulating data on water quality for years. As a result the Watershed Council has substantially more information on water quality in the Yukon River than any other entity. The Council's Science Department maintains a database of biogeochemical water quality data at 45 locations throughout the watershed. Most of these locations are just upstream of an Alaskan Native or First Nation community. Combined with the United States Geological Survey (USGS) data on the Yukon River the Watershed Council has access to over 10 years of data at many locations. The Alaska Department of Environmental Conservation does not collect water quality data on an on-going basis, but the agency conducts periodic assessments of water quality in the Yukon and tributaries (e.g., Tanana in 2006; Yukon mainstem in 2009), that can be mined for additional information. The information provides a baseline for documenting the status of the river's water quality over this time period and beginning the effort to monitor the river's water quality for comparison to the water quality standards.

Most of the monitoring data indicate that the river's water quality is at or above the standards, although not all of the parameters are currently monitored for. At the other end of the scale we will need to identify streams or river stretches deficient in quality for one or more water quality parameters. So far, Alaska DEC has identified just three water bodies in the Yukon basin as impaired -- 15 miles of the Chena River near Fairbanks (turbidity, petroleum hydrocarbons, oils and grease, sediment) and Crooked and Birch Creeks in the eastern part of the basin (turbidity and sediment problems that are a legacy of mining actions). A key task for the Watershed Council, following the adoption of the plan's water quality standards, will be to continue and expand our water quality monitoring (and prod other agencies to do more) to

determine where the water quality remains consistent with the standards and where the water quality problems are already or develop in the future.

**Identifying and assessing the current and potential threats to water quality** and **identifying and assessing actions to address the threats and improve or protect the water quality consistent with the water quality standards.** Developing mechanisms for identifying and assessing current and potential threats to water quality against the standards may become the most important aspect of the ongoing implementation of the watershed plan over time. It will need to be a credible, scientifically sound and standard-driven assessment as to whether and how the actions of others impair or potentially impair water quality. Regardless of who is making decisions and under what legal standards, having the best technical information and capacity to evaluate existing and proposed actions against the standards will always be critical to influencing decisions and eventually gaining a measure of the decisionmaking authority. Similarly, ongoing planning and implementation should describe actions needed to protect water quality that already meets the standards and to improve water quality where it does not, addressing any of these identified threats.

To a certain extent assessing threats and identifying actions will emerge best from local and reach-specific planning efforts that will identify specific threats to water quality and the necessary responses to those threats, local planning efforts that will be consistent with this basinwide or "umbrella" plan and its water quality standards. An ongoing effort to facilitate local watershed planning will have to become part of the Watershed Council's work in the future.

**On-going monitoring and evaluation.** Ultimately the Watershed Council will need a strategy and resources for maintaining and adjusting the Watershed Council's ongoing monitoring of water quality, so as to make the monitoring relevant to assessing progress toward meeting the water quality standards.

The Watershed Council staff -- cooperating with the signatory Tribes and First Nations and their communities -- is already beginning to shift from broad data collection to a focus on how to use the monitoring information and scientific capacity of the Watershed Council to support planning, standards and actions to protect and improve water quality. One of the ongoing internal efforts of the Watershed Council that this plan accelerates will be to expand and evolve the work of the Science Department to support the implementation of water quality standards.

## Implementation

Adopting water quality standards will not by that act alone protect the quality of the water in the Yukon River. This part of the plan highlights the Watershed Council's general strategy for implementing the water quality standards in order to realize the Watershed Council's vision and objectives. Part of that implementation effort involves the Watershed Council's Tribes and First Nations themselves, in the form of a model ordinance or resolution for each Tribe and First Nation to consider adopting to endorse, establish, and implement the Watershed Plan and appropriate water quality standards in their communities and areas of influence in the basin. (See the next section.)

More important, the Tribes and First Nations of the Watershed Council expect to enter into government-to-government discussions with the other sovereign governments in the Yukon River basin, on both sides of the international border, to implement the water quality standards and other elements of this plan. The plan is designed with the assumption that the Tribes and First Nations will work cooperatively, individually and collectively through the Watershed Council, with these other sovereign entities to secure implementation of these standards and the participation of the Tribes and First Nations in relevant decisions to reflect shared governance responsibilities for the river. The Watershed Council believes it is within the authorities of the relevant agencies of the other sovereign entities to enter into cooperative and co-management agreements with the Tribes and First Nations to this end, and to make decisions on land and water uses that implement these standards and use them as assessment and decisionmaking criteria. The plan is constructed to reflect shared governance among the sovereigns, and to acknowledge and underscore the historic and contemporary role of the indigenous nations in the governance of the Yukon River to protect the resource and sustain the life of all the people who will live along the river for generations to come, including support for the fish, wildlife and plants that are essential to their lives.

## Model Ordinances and Resolutions

The watershed plan is designed so that each Tribe and First Nation will be able to consider and adopt or endorse by **Ordinance** or Resolution the Watershed Plan, including the water quality standards and key implementation provisions. On the following pages are model ordinances and resolutions to consider for this purpose.

# MODEL ORDINANCE (ALASKA TRIBES)
# WATERSHED PLAN FOR THE YUKON RIVER



## Section 1 Purpose

The purpose of this Ordinance is to adopt water quality objectives and standards for the waters of the Yukon River and associated procedures to protect the health, safety, and well being of the people of [Tribe]. The land, water and air where the people of the [Tribe] live are sacred, and we are committed to their protection and preservation for this and future generations. The water quality objectives and standards are intended to improve and protect the chemical, physical, biological and cultural integrity of the surface waters of the Yukon River and its tributaries so as to promote the health, safety, welfare and well-being of the people of the Yukon basin and to provide the conditions for healthy, productive, and abundant populations of fish, wildlife and plants dependent on the river.

## Section 2 Authority

The [Tribe] adopts, implements and enforces the provisions of this Ordinance under its inherent sovereignty and under the governmental authority recognized by the U.S. government and the State of Alaska to protect the health and safety of [Tribe] and its members. The Tribal Council exercises its authority to adopt this Ordinance under the Constitution and Code of [Tribe]

## Section 3 Water Quality Plan

It is the policy of the [Tribe] that the water quality in the waters of the Yukon River and its tributaries, and thus the waters of [Community], be monitored, protected, regulated and maintained at the highest possible standards for drinking water quality, for the use of people for all economic, cultural, spiritual and recreational purposes, and for the protection and health of the plants, fish and wildlife that the people of [Tribe] depend on to live. In August 2013, the Yukon River Inter-Tribal Watershed Council, a collective tribal organization of which [Tribe] is a member, approved a Watershed Plan for the Yukon River as a whole, including a set of water quality objectives and standards for the waters of the Yukon River and its tributaries. The Watershed Council's Watershed Plan is attached to this Ordinance. By this Ordinance, the [Tribe] approves and adopts the Watershed Plan and these water quality objectives and standards as those of the [Tribe], with the intent that they be applied and enforced to protect the quality of the waters of the Yukon River. Any person or entity engaged in any activity causing, threatening, or allowing the discharge of a pollutant in amounts significant enough to violate the water quality standards shall be subject to being cited for a violation in the courts of the [Tribe] or referred to other authorities where appropriate.

**Section 4 Cooperative Agreements**

To help implement the Watershed Plan endorsed in this Ordinance, the [Tribe] may enter into cooperative agreements, by itself or in combination with other Tribes and First Nations of the Yukon, with any agency of the United States, department or subdivision of the State of Alaska, other indigenous nations in the Yukon River basin, tribal organizations such as the Yukon River Inter-Tribal Watershed Council, Alaska Native corporations and organizations, or other non-governmental organizations to protect and improve the quality of the waters consistent with these standards to promote the health, safety and welfare of the people of [Tribe]. The [Tribe] authorizes the Yukon River Inter-Tribal Watershed Council to act as an agency on its behalf in discussing implementation of the Watershed Plan with the representatives of other governments.

# MODEL RESOLUTION (ALASKA TRIBES)
# WATERSHED PLAN FOR THE YUKON RIVER



**Section 1 Purpose (or, "Whereas" clauses…)**

The purpose of this Resolution is to endorse a Watershed Plan, including water quality objectives and standards for the waters of the Yukon River and associated procedures to protect the health, safety, and well being of the people of [Tribe]. The land, water and air where the people of the [Tribe] live are sacred, and we are committed to their protection and preservation for this and future generations. The water quality objectives and standards are intended to improve and protect the chemical, physical, biological and cultural integrity of the surface waters of the Yukon River and its tributaries so as to promote the health, safety, welfare and well-being of the people of the Yukon basin and to provide the conditions for healthy, productive, and abundant populations of fish, wildlife and plants dependent on the river.

**Section 2 Authority (could be more "Whereas" clauses…)**

The [Tribe] adopts this Resolution under its inherent sovereignty and under the governmental authority recognized by the U.S. government and the State of Alaska to protect the health and safety of [Tribe] and its members. The Tribal Council exercises its authority to adopt this Resolution under the Constitution and Code of [Tribe]

**Resolved:**

**Section 3 Watershed Plan**

It is the policy of the [Tribe] that the water quality in the waters of the Yukon River and its tributaries, and thus the waters of [Community], be monitored, protected, regulated and maintained at the highest possible standards for drinking water quality, for the use of people for all economic, cultural, spiritual and recreational purposes, and for the protection and health of the plants, fish and wildlife that the people of [Tribe] depend on to live. In August 2013, the Yukon River Inter-Tribal Watershed Council, a collective tribal organization of which [Tribe] is a member, approved a Watershed Plan for the Yukon River as a whole, including a set of water quality objectives and standards for the waters of the Yukon River and its tributaries. The Watershed Council's Watershed Plan is attached to this Resolution. By this Resolution, the [Tribe] approves, endorses and calls for the implementation of the Watershed Plan and these water quality objectives standards, with the intent that they be applied and enforced to protect the quality of the waters of the Yukon River.

**Section 4 Cooperative Agreements**

To help implement the Watershed Plan endorsed by this Resolution, the [Tribe] may enter into cooperative agreements, by itself or in combination with other Tribes and First Nations of the Yukon, with any agency of the United States, department or subdivision of the State of Alaska, other indigenous nations in the Yukon River basin, tribal organizations such as the Yukon River Inter-Tribal Watershed Council, Alaska Native corporations and organizations, or other non-governmental organizations to protect and improve the quality of the waters consistent with these standards to promote the health, safety and welfare of the people of [Tribe]. The [Tribe] authorizes the Yukon River Inter-Tribal Watershed Council to act as an agency on its behalf in discussing implementation of the Watershed Plan with the representatives of other governments.

# MODEL ORDINANCE (YUKON FIRST NATIONS) WATERSHED PLAN FOR THE YUKON RIVER



## Section 1 Purpose

The purpose of this Ordinance is to adopt water quality objectives and standards for the waters of the Yukon River and associated procedures to protect the health, safety, and well being of the people of [First Nation]. The land, water and air where the people of the [First Nation] live are sacred, and we are committed to their protection and preservation for this and future generations. The water quality standards are intended to improve and protect the chemical, physical, biological and cultural integrity of the surface waters of the Yukon River and its tributaries so as to promote the health, safety, welfare and well-being of the people of the Yukon basin and to provide the conditions for healthy, productive, and abundant populations of fish, wildlife and plants dependent on the river.

## Section 2 Authority

The [First Nation] adopts, implements and enforces the provisions of this Ordinance under its inherent sovereignty and under the governmental authority recognized by the governments of Canada and Yukon Territory and described in the 1993 Umbrella Final Agreement, in [x] Self-Government Agreement and elsewhere, to protect the health and safety of the First Nation and its members, and the land, air, water, and natural resources used by the people of [First Nation]. The First Nation Council exercises its authority to adopt this Ordinance under the Constitution and Code of [First Nation]

## Section 3 Water Quality Plan

It is the policy of the [First Nation] that the water quality in the waters of the Yukon River and its tributaries, and thus the waters of [First Nation], be monitored, protected, regulated and maintained at the highest possible standards for drinking water quality, for the use of people for all economic, cultural, spiritual and recreational purposes, and for the protection and health of the plants, fish and wildlife that the people of [First Nation] depend on to live. In August 2013, the Yukon River Inter-Tribal Watershed Council, a collective tribal organization of which [First Nation] is a member, approved a Watershed Plan, including a set of water quality objectives and standards for the waters of the Yukon River and its tributaries. The Watershed Council's Watershed Plan is attached to this Ordinance. By this Ordinance, the [First Nation] approves and adopts the Watershed Plan and these water quality objectives and standards as those of the [First Nation], with the intent that they be applied and enforced to protect the quality of the waters of the Yukon River. Any person or entity engaged in any activity causing, threatening, or allowing the discharge of a pollutant in amounts significant enough to violate the water quality standards

shall be subject to being cited for a violation in the courts of the [First Nation] or referred to other authorities where appropriate.

**Section 4 Cooperative Agreements**

To help implement the Watershed Plan endorsed in this Ordinance, the [First Nation] may enter into cooperative agreements, by itself or in combination with other First Nations and Tribes of the Yukon River basin, with any agency of the government of Canada or Yukon, other indigenous nations in the Yukon River basin, Native organizations such as the Yukon River Inter-Tribal Watershed Council, Native corporations, or other non-governmental organizations to protect and improve the quality of the waters consistent with these standards to promote the health, safety and welfare of the people of [First Nation]. The [First Nation] authorizes the Yukon River Inter-Tribal Watershed Council to act as an agency on its behalf in discussing implementation of the Watershed Plan with the representatives of other governments.

# MODEL RESOLUTION (YUKON FIRST NATIONS) WATERSHED PLAN FOR THE YUKON RIVER



**Section 1 Purpose (or, "Whereas" clauses…)**

The purpose of this Resolution is to endorse a Watershed Plan, including water quality objectives and standards for the waters of the Yukon River and associated procedures to protect the health, safety, and well being of the people of [First Nation]. The land, water and air where the people of the [First Nation] live are sacred, and we are committed to their protection and preservation for this and future generations. The water quality objectives and standards are intended to improve and protect the chemical, physical, biological and cultural integrity of the surface waters of the Yukon River and its tributaries so as to promote the health, safety, welfare and well-being of the people of the Yukon basin and to provide the conditions for healthy, productive, and abundant populations of fish, wildlife and plants dependent on the river.

**Section 2 Authority (could be more "Whereas" clauses…)**

The [First Nation] adopts this Resolution under its inherent sovereignty and under the governmental authority recognized by the governments of Canada and Yukon Territory and described in the 1993 Umbrella Final Agreement, in [x] Self-Government Agreement and elsewhere, to protect the health and safety of the First Nation and its members, and the land, air, water, and natural resources used by the people of [First Nation]. The First Nation Council exercises its authority to adopt this Ordinance under the Constitution and Code of [First Nation]

**Resolved:**

**Section 3 Watershed Plan**

It is the policy of the [First Nation] that the water quality in the waters of the Yukon River and its tributaries, and thus the waters of [First Nation], be monitored, protected, regulated and maintained at the highest possible standards for drinking water quality, for the use of people for all economic, cultural, spiritual and recreational purposes, and for the protection and health of the plants, fish and wildlife that the people of [First Nation] depend on to live. In August 2013, the Yukon River Inter-Tribal Watershed Council, a collective tribal organization of which [First Nation] is a member, approved a Watershed Plan for the Yukon River as a whole, including a set of water quality objectives and standards for the waters of the Yukon River and its tributaries. The Watershed Council's Watershed Plan is attached to this Resolution. By this Resolution, the [First Nation] approves, endorses and calls for the implementation of the Watershed Plan and

these water quality objectives standards, with the intent that they be applied and enforced to protect the quality of the waters of the Yukon River.

**Section 4 Cooperative Agreements**

To help implement the Watershed Plan endorsed in this Resolution, the [First Nation] may enter into cooperative agreements, by itself or in combination with other First Nations and Tribes of the Yukon River basin, with any agency of the government of Canada or Yukon, other indigenous nations in the Yukon River basin, Native organizations such as the Yukon River Inter-Tribal Watershed Council, Native corporations, or other non-governmental organizations to protect and improve the quality of the waters consistent with these standards to promote the health, safety and welfare of the people of [First Nation]. The [First Nation] authorizes the Yukon River Inter-Tribal Watershed Council to act as an agency on its behalf in discussing implementation of the Watershed Plan with the representatives of other governments.