

FCR23-05 Executive Summary

General Description	FCR23-05 reviews the closure to the harvest of all fish in the Delta River by federally qualified subsistence users.
Current Regulation	<p>§___.27(e)(3) Yukon-Northern Area</p> <p>***</p> <p>(x) You may not subsistence fish in the Delta River.</p> <p>***</p>
OSM Preliminary Conclusion	Rescind
Yukon-Kuskokwim Delta Subsistence Regional Advisory Council Recommendation	
Western Interior Alaska Subsistence Regional Advisory Council Recommendation	
Eastern Interior Alaska Subsistence Regional Advisory Council Recommendation	
North Slope Subsistence Regional Advisory Council Recommendation	
Interagency Staff Committee Comments	
ADF&G Comments	
Written Public Comments	None

FEDERAL FISHERIES CLOSURE REVIEW
FCR23-05

ISSUE

FCR23-05 is a Federal Subsistence Board (Board) directed review of a Federal subsistence fishery closure to the harvest of all fish in the Delta River. It is the Board's policy to review existing closures every four years so that Federal public lands and waters can be reopened when the closures are no longer necessary. The purpose of this closure review is to determine if the closure is still warranted and to ensure the closure does not remain in place longer than needed.

Closure Location: Yukon River Drainage, Delta River—all fish

The closure area includes Federal public waters of the mainstem of the Delta River from the outlet of Lower Tangle Lake through the Donnelly Training Area (**Figure 1**). The closure applies to all fish, but the closure area does not contain salmon. Therefore, the closure review focuses on nonsalmon species.

Current Allowed Usage

Under Federal regulations, federally qualified subsistence users may not harvest any species of fish in the Delta River. Under State regulations, subsistence and personal use fishing are prohibited in the Delta River but sport fishing for nonsalmon fish is allowed in the closure area.

Current Federal Regulation

§ __.27(e)(3) Yukon-Northern Area

(v) Except as provided in this section, and except as may be provided by the terms of a subsistence fishing permit, you may take fish other than salmon at any time.

(x) You may not subsistence fish in the Delta River.

(xvi) Unless otherwise specified in this section, you may take fish other than salmon by set gillnet, drift gillnet, beach seine, fish wheel, long line, fyke net, dip net, jigging gear, spear, lead, or rod and reel, subject to the following restrictions, which also apply to subsistence salmon fishing:

(B) You may not use an aggregate length of set gillnet in excess of 150 fathoms, and each drift gillnet may not exceed 50 fathoms in length.

(C) In Districts 4, 5, and 6, you may not set subsistence fishing gear within 200 feet of other fishing gear operating for commercial, personal, or subsistence use . . .

§___.27 (b) Subsistence Taking of Fish

(4) Except as otherwise provided for in this section, you may not obstruct more than one-half the width of any stream with any gear used to take fish for subsistence uses.

(16) Unless specified otherwise in this section, you may use a rod and reel to take fish without a subsistence fishing permit. Harvest limits applicable to the use of a rod and reel to take fish for subsistence uses shall be as follows:

(ii) Except as otherwise provided for in this section, if you are not required to obtain a subsistence fishing permit for an area, the harvest and possession limits for taking fish for subsistence uses with a rod and reel are the same as for taking fish under State of Alaska subsistence fishing regulations in those same areas. If the State does not have a specific subsistence season and/or harvest limit for that particular species, the limit shall be the same as for taking fish under State of Alaska sport fishing regulations.

Closure Dates: Year-round

Current State Regulation

Yukon Area—Subsistence

5 AAC 01.225. Waters closed to subsistence fishing

(e) The Delta River is closed to subsistence fishing

(1) between the mouth of the Delta River and an ADF&G regulatory marker placed two miles upstream from the mouth of the Delta River;

(2) for salmon;

(3) for finfish other than salmon in that portion of the Delta River not included in the nonsubsistence area described in 5 AAC 99.015(a)(4).

Tanana River Area—Sport

5 AAC 74.010. Seasons, bag, possession, and size limits, and methods and means for the Tanana River Area

(a) Except as otherwise specified in this section or through an emergency order issued under AS 16.05.060, sport fishing is permitted year round in the waters of the Tanana River Area.

(b) Except as otherwise specified in (c) and (d) of this section, the following are the general bag, possession, and size limits and means for finfish in the waters of the Tanana River Area:

(1) king salmon 20 inches or greater in length: the bag and possession limit is one fish;

(2) salmon, other than king salmon: the bag and possession limit is three fish, with no size limit;

(3) Arctic char/Dolly Varden: the bag and possession limit is 10 fish, with no size limit;

(4) lake trout: the bag and possession limit is two fish, with no size limit;

(6) Arctic grayling: the bag and possession limit is five fish, with no size limit;

(7) whitefish: the bag and possession limit is 15 fish, with no size limit;

(8) sheefish: the bag and possession limit is two fish, with no size limit;

(9) northern pike: the bag and possession limit is five fish, of which only one fish may be 30 inches or greater in length;

(10) burbot: the bag and possession limit is 15 fish, with no size limit;

(11) finfish species that are not specified in this section: there are no bag, possession, or size limits;

(c) The following are the exceptions to the general bag, possession, and size limits, and fishing seasons specified in (a) and (b) of this section for the Tanana River Area:

(6) in the Delta River and its tributaries,

(A) sport fishing for salmon is closed;

(B) all sport fishing is closed in that portion of the Delta River between its mouth and an ADF&G regulatory marker located two miles upstream;

(24) in the Tangle Lake system, including all waters of the Delta River drainage upstream from Wildhorse Creek,

(B) the bag and possession limit for lake trout is one fish, no size limit;

(C) the bag and possession limit for burbot is two fish, with no size limit;

(d) In the Tanana River Management Area, the following special provisions to methods and means apply:

(1) from October 15 through May 15, set lines may be used to take burbot in all lakes in the Tanana River drainage, except

(G) the Tangle Lake system;

(19) in the Tangle Lake system, the use of set lines is prohibited;

5 AAC 74.030. Methods, means, and general provisions – Finfish

(b) In all waters, multiple hooks with a gap between the point and shank greater than one-half inch may be used for taking fish other than salmon.

5AAC 74.035. Ice house registration

(a) From October 1 through April 30, a person using an ice house that is not removed from the ice daily shall register that ice house with, and receive a permit from, the department for that year.

(b) An ice house registered under this section must display the department's permit number on one side and on the roof of the ice house in numbers not less than 12 inches high, one inch wide, and plainly visible. The numbers must be in a color that contrasts with the color of the ice house.

(c) An ice house must be removed from the ice by April 30, however, the department may designate other conditions on the permit, including other time and area restrictions.

Yukon Area—Personal Use

5 AAC 77.174. Waters closed to personal use fishing

(b) The following waters are closed to personal use fishing:

(6) the Delta River.

5 AAC 77.190. Personal use whitefish and sucker fishery

(a) Whitefish and suckers may be taken for personal use only in the Fairbanks Nonsubsistence Area described in 5 AAC 99.015(a) (4) under the authority of a permit issued under 5 AAC 77.015.

(b) The department shall adhere to the following when issuing personal use whitefish and sucker permits:

(1) the fishing effort may be permitted only in places and during times when resource abundance will allow a harvest without jeopardizing sustained yield and in a manner that will provide for an orderly fishery;

(2) permits may be issued for spears and set gillnet, beach seine, dip net, fyke net, and fish wheel gear;

(3) finfish other than whitefish and suckers may not be retained under a permit issued under this section.

Regulatory Year Initiated: 1992

Extent of Federal Public Lands/Waters

For purposes of this analysis, the phrase “Federal public waters” is defined as those waters described under 36 CFR §242.3 and 50 CFR §100.3. ANILCA established the upper portion of the Delta River (**Figure 1**) as a component of the National Wild and Scenic River System to be administered by the Bureau of Land Management (BLM). The first 20 miles of the Delta River, from the outlet of Lower Tangle Lake, are classified as “wild.” The subsequent 18 miles of the Delta River are classified as “recreational.” Approximately 12 miles of the Delta River downstream of the “recreational” waters are on general domain land, which is also managed by BLM (**Figure 1**). Downstream of the general domain land is the Donnelly Training Area managed by the Department of Defense (DOD). A Sikes Act Permit is required, and all users must check in before accessing the DOD lands. On general domain and DOD lands, Federal subsistence regulations apply only to non-navigable waters.

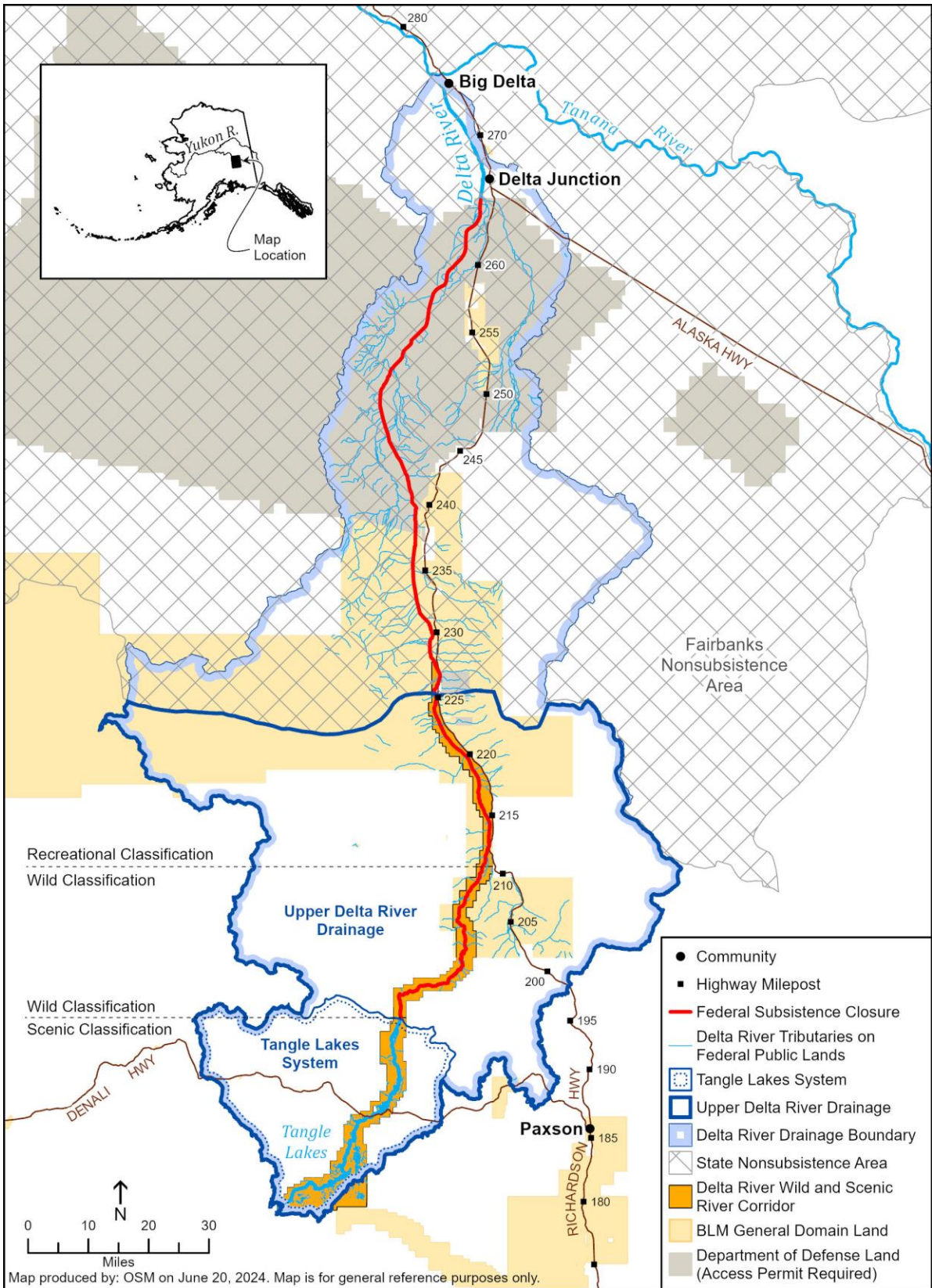


Figure 1. Federal public waters of the Delta River.

Customary and Traditional Use Determination

Residents of the Yukon-Northern Area have a customary and traditional use determination for freshwater fish species other than salmon in the Yukon River drainage.

Regulatory History

In 1992, the Federal Subsistence Management Program promulgated regulations governing the harvest of fish for subsistence uses in non-navigable waters within and adjacent to Federal public lands (57 Fed. Reg. 22940 [May 29, 1992]). These regulations incorporated many provisions from State subsistence fishing regulations. The closure under review in this analysis was incorporated into Federal regulations in this manner and has not been subsequently modified.

In 1999, the Board also adopted Federal regulations for fish in navigable waters within and adjacent to Federal public lands where there is a Federal reserved water right (64 Fed. Reg. 1276 [January 8, 1999]). These regulations do not apply on navigable waters within and adjacent to BLM general domain lands or DOD lands (see 50 CFR 100.3).

Closure Last Reviewed: 2023—FCR23-05

The Federal subsistence fishery closure to the harvest of all fish in the Delta River was reviewed for the first time during the 2023–2025 fisheries regulatory cycle under FCR23-05.

The Delta River closure is located in the Eastern Interior Federal subsistence region. When considering the closure (FCR23-05) during the 2023–2025 regulatory cycle, the Eastern Interior Alaska Subsistence Regional Advisory Council (Eastern Interior Council) voted to defer FCR23-05 to the 2025 fisheries regulatory cycle. The Eastern Interior Council stated that they needed to hear from those local residents who would be most directly affected by rescinding the Delta River closure, including from the Delta State Fish and Game Advisory Committee, who had not yet discussed the closure review at the time of the Eastern Interior Council meeting. Although the Eastern Interior Council supported increasing subsistence opportunity, they expressed concern due to a lack of harvest monitoring and potential for overharvest if the closure were to be lifted with no regulations in place to limit harvest. Because of these conservation concerns, the Eastern Interior Council recommended deferring this closure review until it would align with the fisheries regulatory cycle and a concurrent proposal could be submitted to put harvest restrictions in place. This would also give time for more local residents to weigh in on the issue.

Three other Councils represent areas with a customary and traditional use determination for freshwater species other than salmon in the Yukon River Drainage, which includes the Delta River: the Yukon-Kuskokwim Delta Subsistence Regional Advisory Council, the Western Interior Alaska Subsistence Regional Advisory Council, and the North Slope Subsistence Regional Advisory Council. During the 2023–2025 fisheries regulatory cycle, these three Councils deferred to the Eastern Interior Council recommendation on this closure review.

Although the Southcentral Alaska Subsistence Regional Advisory Council (Southcentral Council) does not represent communities with a customary and traditional use determination for freshwater species other than salmon in the Yukon River drainage, it provided a comment on the closure to the Board. The Southcentral Council recommended removing the Federal subsistence fishing closure on the Delta River but asked that the fishery's opening be delayed until the Office of Subsistence Management (OSM) has conducted an analysis to determine which federally qualified subsistence users should receive a customary and traditional use determination of the Delta River drainage. The Southcentral Council also asked that OSM recommend appropriate methods and means of harvest to ensure the fishery is sustainable. The Southcentral Council expressed their concern that, as written, OSM's recommendation would make the Federal public waters of the Delta River drainage available to all federally qualified subsistence users of the Yukon-Northern Area, whereas subsistence users in the Ahtna Traditional Use Territory would not be eligible to subsistence fish under Federal regulations in an area that the Ahtna people have fished and stewarded for countless generations.

During the 2023–2025 fisheries regulatory cycle, the Board deferred review of the Delta River Federal subsistence closure to the next fisheries regulatory cycle, based on the Eastern Interior Council's recommendation.

Current Events

The Delta Advisory Committee met on October 19, 2022, and voted unanimously to maintain the closure due to concerns regarding sustainability were people to fish with gillnets for non-salmon fish in the Delta River area (Delta AC 2022).

Proposal FP25-17, submitted by the Eastern Interior Alaska Subsistence Regional Advisory Council (Eastern Interior Council), requests the Federal Subsistence Board (Board) rescind the closure to the harvest of all fish in the Delta River and modify regulations to allow rod and reel gear only in the drainage and mirror State sport fish harvest and possession limits.

Justification for Original Closure

The Federal Subsistence Management Program justification for incorporating the original State closure in Federal regulations was to minimize disruption to the State's continuing fish and game management, because of the uncertainty over the resumption of State management of subsistence, yet still fulfill the requirements of Title VIII of ANILCA (55 FR 27114, June 29, 1990).

Council Recommendation for Original Closure

N/A

State Recommendation for Original Closure

N/A

Biological Background

Salmon

Chum and Coho salmon spawn in the lower section of the Delta River (ADF&G 2023a); however, salmon do not inhabit the closure area (BLM n.d.).

Nonsalmon Fish

The nonsalmon fish community in the Delta River is comprised of Arctic Grayling, Burbot, Round Whitefish, Longnose Sucker, Lake Trout, Dolly Varden, and Slimy Sculpin (Gryska 2011). Arctic Grayling is the predominant member of the nonsalmon fish community and limited information exists for the other nonsalmon species.

Arctic Grayling

Arctic Grayling abundance and seasonal movements were assessed within an approximately 10.5-mile portion of the Delta River closure area by the Alaska Department of Fish and Game (ADF&G) and BLM (Gryska 2011, 2015). The abundance of Arctic Grayling was estimated using mark-recapture techniques in 2008. The estimated number of Arctic Grayling ≥ 240 mm FL was 44,212 fish (SE = 9,108), ≥ 270 mm FL was 23,152 fish (SE = 3,189), and ≥ 330 mm FL was 5,864 fish (SE = 818; Gryska 2011). The density estimates for Arctic Grayling ≥ 240 mm and ≥ 270 mm FL were among the highest ever documented for this species in Alaska. The seasonal movements and locations of Arctic Grayling (≥ 320 mm FL) were assessed using radio telemetry in 2008 and 2009 (Gryska 2015). Approximately 95% of radio tagged fish overwintered in the study area. Locations and patterns of dispersal varied by season. In summer, Arctic Grayling were dispersed throughout the study area before concentrating in two locations during winter. Spawning likely occurred in late spring/early summer with most fish occupying the upper portion of the study area. This research indicates the study area provides year-round habitat for this large population of Arctic Grayling.

Cultural Knowledge and Traditional Practices

If the closure is rescinded, residents of rural communities located in reasonable proximity to the Delta River are most likely to subsistence fish in the current Federal closure area. This area includes residents of five separate Census Designated Places (CDPs) with a total estimated population of 4,276 (Table 1).

Table 1. Estimated population of Census Designated Places in the Delta River area (ADLWD 2024).

Census Designated Place	Estimated 2023 Population
Deltana	2,410
Delta Junction City	978
Big Delta	434
Fort Greely	383
Whitestone	71
Total	4,276

The small community of Paxson, located in the Ahtna Traditional Use Territory, is also located in proximity to the Delta River, but does not have a customary and traditional use determination for freshwater fish other than salmon in the Yukon River drainage. Therefore, Paxson is not eligible to participate in subsistence fishing for these species in the Delta River drainage under Federal subsistence regulations.

Subsistence fishing in the Delta River and Tangle Lakes area historically included spearfishing for whitefish (BLM 1983). Unfortunately, there are no readily available data on present-day fishing by residents of the nearby CDPs. These communities are currently only able to fish on the Delta River mainstem under State sport fishing regulations. Harvest by rod and reel is often documented in Alaska Department of Fish and Game (ADF&G), Division of Subsistence surveys, which include harvest under any opportunity (e.g., Holen et al. 2015). However, ADF&G, Division of Subsistence has never conducted a subsistence survey for these communities (CSIS 2023).

The best available fishing data set for communities near the Delta River is their reported subsistence and personal use harvest of nonsalmon species in areas adjacent to the closure area (**Tables 2 and 3**). While these data are not from the Delta River mainstem itself, they may provide insight on potential harvest by these communities in the area that is currently closed. **Table 2** shows harvest by residents of two communities, Delta Junction and Big Delta, using the State's Upper Tanana River drainage subsistence permit. This permit area includes tributaries of the Delta River drainage south of the State's Fairbanks Nonsubsistence Use Area, including Tangle Lakes (**Figure 1**) (but not the Delta River itself, which is also closed to subsistence under State regulations) as well as the Upper Tanana River, but harvest data are only available in combination for the two areas.

Despite these limitations, Delta Junction and Big Delta's nonsalmon harvest using the State's Upper Tanana River drainage subsistence permit from 2012 to 2021 is included here to give a general sense of the communities' subsistence use patterns for adjacent areas (**Table 2**). Of the five species harvested, residents fishing under State subsistence regulations harvested the greatest number of whitefish, followed by Northern Pike. Overall, harvest was greatest from 2017 to 2020 (**Table 2**; Ransbury 2022, pers. comm.).

Delta Junction and Big Delta's harvest from the State's personal use whitefish and sucker fishery, which occurs in the State Fairbanks Nonsubsistence Use Area, is shown in **Table 3**. The Delta River mainstem itself is closed to personal use fishing. Harvest by these communities in the personal use fishery has declined since approximately 2019.

Table 2. Reported nonsalmon harvest under the Upper Tanana drainage subsistence use permit (which includes the portion of the Delta River drainage south of the Fairbanks Nonsubsistence Use Area, excluding the Delta River itself), by residents of Delta Junction and Big Delta from 2012 to 2021, excluding 2015. Harvest from 2015 is excluded due to low harvest numbers and resulting confidentiality issues. The table includes permits registered to residents with a Delta Junction or Big Delta mailing or physical address (Ransbury 2022, pers. comm.).

Year	Permits	Whitefish	Northern Pike	Arctic Grayling	Burbot	Longnose Sucker
2021	5	5	14	0	9	0
2020	11	514	284	5	55	86
2019	7	406	126	23	2	0
2018	8	342	67	5	25	0
2017	5	311	23	0	5	1
2016	3	12	0	0	23	0
2014	1	0	0	0	0	0
2013	3	0	0	0	0	0
2012	7	41	0	0	0	0
Average	6	181	57	4	13	10

Table 3. Delta Junction and Big Delta’s harvest from 2013 to 2022 in the State’s personal use whitefish and sucker fishery, which occurs in the State Fairbanks Nonsubsistence Use Area. (Padilla 2023, pers. comm.).

Year	Whitefish	Longnose Sucker
2022	0	32
2021	1	30
2020	0	0
2019	0	38
2018	0	107
2017	84	161
2016	123	180
2015	211	316
2014	57	255
2013	19	109
Average	50	123

Harvest History

Subsistence fishing is prohibited in the Delta River under State and Federal regulations so there is no legal subsistence harvest in this system. Harvest is allowed under State sport fishing regulations.

Sport fish harvest estimates for the Delta River are provided by the Alaska Sport Fishing Survey. Sport fish harvest is not estimated when there are fewer than 12 respondents for an area of interest (Romberg et al. 2023). Estimates for the Delta River downstream of Wildhorse Creek are available for 1996 to 2006. For Arctic Grayling, median estimated sport fish harvest over this time period was 298 fish and ranged from 159 fish in 1998 to 770 fish in 1997. Lake Trout were reportedly harvested in 1999 (14 fish) and 2002 (48 fish). There were multiple other nonsalmon species where harvest was only estimated for a single year. Dolly Varden were harvested in 1996 (12 fish), whitefish were harvested in 2000 (7 fish), and Burbot were harvested in 2002 (26 fish). Over the time period when sport fishing harvest estimates are available, the median number of anglers was 319 and ranged from 311 in 1996 to 381 in 1997. The Delta River downstream of Wildhorse Creek has not received more than 12 responses since 2006 suggesting sport fish harvest and effort may not be large enough to cause conservation concerns in the area (ADF&G 2023b).

Alternatives Considered

One alternative is to retain the closure. Retaining the closure would protect populations from overharvest until a proposal to restrict harvest and/or gear types in the closure area could be submitted. Federally qualified subsistence users could continue to harvest fish under State sport fishing regulations while the Federal closure was in place. This alternative was rejected because it would not provide a Federal subsistence priority in the closure area.

A second alternative is to modify the closure by closing the fishery to all users and uses. This would fully protect fish populations in the closure area. Under this alternative, there would be no subsistence or sport fishing opportunity. Closing to all users and uses would eliminate the current situation, in which Federal public waters are closed to subsistence fishing while remaining open to other uses. This alternative was rejected because it would cause an unnecessary restriction on non-subsistence uses as sport fish harvest data suggest the sport fishery does not present a conservation concern.

Effects

If the closure is rescinded, Federal subsistence regulations for the Yukon-Northern Area would apply to Federal public waters of the Delta River. State regulations would continue to allow sport fishing in the closure area. Federal regulations would change to allow subsistence harvest of all fish species by rural residents of the Yukon-Northern Area. Federal subsistence harvest would be unrestricted when using gillnets, beach seines, fish wheels, long lines, fyke nets, dip nets, jigging gear, spears, and leads. Federal subsistence rod and reel harvest limits would match State sport fishing harvest and possession limits.

Rescinding the closure would establish a Federal subsistence priority and provide subsistence harvest opportunity in an area currently closed to subsistence fishing but open to other uses. However, allowing unrestricted harvest in a road-accessible system may increase harvest pressure and result in a conservation concern. Populations may be protected by establishing a more conservative management framework during this or future fisheries regulatory cycles. Until then, the Federal in-season manager

may issue special actions to set provisions for the fishery, such as stipulating gear types and setting harvest limits to protect populations in the area.

OSM PRELIMINARY CONCLUSION

- Retain the Status Quo**
- Rescind the Closure**
- Modify the Closure**
- Defer Decision on the Closure or Take No Action**

The modified regulation should read:

§ __.27(e)(3) Yukon-Northern Area

~~(x)You may not subsistence fish in the Delta River.~~

Justification

Currently, Federal public waters of the Delta River are closed to the harvest of all fish by federally qualified subsistence users but open to sport fishing under State regulations. Rescinding the closure would establish a Federal subsistence priority in the area. Previous research indicates the closure area contains an abundant population of Arctic Grayling with one of the highest recorded densities in the State. However, allowing unrestricted harvest for gear types other than rod and reel may lead to overharvest and local depletion of stocks. While populations may be protected by limiting subsistence harvest to rod and reel only and/or establishing harvest limits, these modifications are not possible through the closure review process and would require a fisheries proposal to be adopted by the Board. Until a proposal is adopted by the Board, the Federal in-season manager may use their delegated authority to restrict gear types and/or harvest limits to protect populations in the closure area. If a proposal is submitted, OSM recommends limiting harvest to rod and reel only in the Delta River drainage.

Literature Cited

ADF&G. 2023a. Anadromous Waters Catalog. Available online at: <https://www.adfg.alaska.gov/sf/SARR/AWC/index.cfm?ADFG=main.interactive>. Retrieved October 10, 2023.

ADF&G. 2023b. Alaska Sport Fishing Survey database. Available online at: <https://www.adfg.alaska.gov/sf/sportfishingsurvey/>. Retrieved October 10, 2023.

ADLWD. 2024. Alaska population estimates: Cities and census designated places (CDPs), 2020 to 2023. Alaska department of labor and Workforce Development. <https://live.laborstats.alaska.gov/data-pages/alaska-population-estimates>. Retrieved: May 28, 2024.

BLM. No date. Delta Wild and Scenic River Brochure.
https://www.blm.gov/sites/blm.gov/files/documents/files/PublicRoom_Alaska_Delta-WSR-Brochure.pdf.
Retrieved January 28, 2022.

BLM. 1983. River management plan: Delta River: A component of the National Wild and Scenic Rivers System. December 1983. U.S. Department of the Interior, Bureau of Land Management, Anchorage District, Alaska.

CSIS. 2023. Community Subsistence Information System. <http://www.adfg.alaska.gov/sb/CSIS/>. Retrieved December 6, 2023.

Delta AC (Advisory Committee). 2022. Audio recording of October 19, 2022 proceedings. Delta Junction, AK.

Gryska, A. D. 2011. Stock assessment Arctic grayling in the Delta River, 2008. Alaska Department of Fish and Game, Fishery Data Series No. 11-01, Anchorage.

Gryska, A. D. 2015. Seasonal distributions of Arctic grayling in the Upper Delta River. Alaska Department of Fish and Game, Fishery Data Series No. 15-21, Anchorage.

Holen, D., S.M. Hazell, and G. Zimpelman. 2015. The harvest and use of wild resources in selected communities of the Copper River Basin and East Glenn Highway, Alaska, 2013. ADF&G, Div. of Subsistence Tech. Paper No. 405. Anchorage, AK.

Padilla, A. 2023. Fishery Biologist. Personal communication: email. ADF&G. Fairbanks, AK.

Ransbury, S. 2022. Assistant Area Management Biologist. Personal communication: email. ADF&G. Anchorage, AK.

Romberg, W. J., J. Kirsch, S. Restrepo, K. Sundet, M. Martz, and I. Rafferty. 2023. Estimates of participation, catch, and harvest in Alaska sport fisheries during 2018. Alaska Department of Fish and Game, Fishery Data Series No. 23-06, Anchorage.