

Dolly Varden (*Salvelinus malma*)

Data: Alaska Department of Fish & Game

Partners: AK

Species Status Review:

Populations of Dolly Varden are generally thought to be stable throughout Alaska with some concerns about specific stocks, primarily around urban centers.

Sportfishing Status of Dolly Varden:

Dolly Varden are a popular sport and subsistence fish throughout much of their range. Annually, sport anglers in Alaska catch approximately 500,000 and harvest over 50,000 fish.

Distribution of Dolly Varden:

Dolly Varden are the most widely-distributed salmonid in Alaska and occupy most coastal waters in the state. Two forms or sub-species of Dolly Varden have been described in Alaska. The northern (*S. m. malma*) form is distributed from the Mackenzie River to the north side of the Alaska Peninsula while the southern form (*S. m. lordini*) is distributed on the south side of the Alaska Peninsula to the southern tip of Southeast Alaska, including Kodiak and the Aleutian Islands. The distribution of each form has changed in recent years with knowledge gained from genetic analysis. Both forms have anadromous and stream-resident forms but the lacustrine (lake dwelling) form is rare in the northern form but common in the southern form. The forms may differ greatly in the distance they travel during their marine migrations (Crane et al. 2004). The southern form typically migrates 60 km while the northern form may migrate much further and have been documented migrating from northwest Alaska to Russian freshwaters to spawn or overwinter (DeCicco 1997).

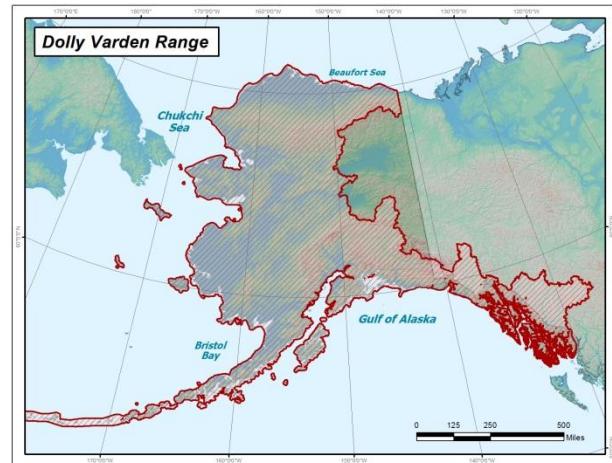
Dolly Varden Habitat Requirements:

Dolly Varden typically spend most of their time in cool, freshwater habitats but may also migrate

into the various saltwater habitats. Freshwater habitat requirements of Dolly Varden range from headwater streams to large deep lakes and large rivers. Saltwater habitat ranges from estuaries and coastal shorelines to the open ocean. Unimpeded migrations within and between freshwater habitats and passage to and from the ocean are essential to maintain the different life histories expressed by Dolly Varden populations.

Range of Dolly Varden:

The range of Dolly Varden extends throughout the coastal areas of the state from Southeast Alaska across the Gulf of Alaska and the Bering Sea into the Chukchi and Beaufort seas to the Mackenzie River in northern Canada. Dolly Varden also occur in streams in Interior Alaska and the Brooks Range. Elsewhere, their range stretches along the Pacific coast of North America from Washington to the Arctic coast of Canada, and along the Pacific coast of Asia from Russia south to Japan and Korea.



Concerns, Issues, or Obstacles relative to the Conservation and Improvement of the status of Dolly Varden:

Population Viability Concerns

None to date.

Dolly Varden (*Salvelinus malma*)

Genetic Considerations

While northern form Dolly Varden migrate home to their natal stream to spawn, tagging studies have shown that overwintering fish can be from multiple river systems (DeCicco 1997; Armstrong and Morrow 1980). This suggests that subsistence and sport harvests in a particular location may be comprised of populations from several different natal streams (Everett et al. 1997). Mixed-stock analysis using genetic data can provide an effective method for estimating the stock composition of Dolly Varden aggregations in overwintering areas and fishery harvests (Crane et al. 2005). A key management objective for effective management of subsistence fisheries is to estimate stock composition and relative contributions harvested.

Disease Concerns

There are no specific disease concerns that are not addressed in existing policies designed to prevent the introduction or spread of pathogens.

Habitat Concerns

Major habitat concerns are related to the development of hydroelectric dams and introduction of other salmonid species as part of salmon aquaculture programs. Localized populations of Dolly Varden are also vulnerable to urbanization and other land use activities such as mining, logging, gas development and road construction. Also, climate change may have profound effects on Dolly Varden, including changes in marine environment movement patterns resulting from alterations in ocean productivity and fish metabolism. Additionally, there may be shifts in the location and usage of overwintering areas resulting from alterations in stream discharge and freeze cycles (Crane et al. 2005).

Introduced Species Concerns

To date there are no concerns regarding interactions with introduced species. However, Dolly Varden apparently can hybridize with introduced brook trout possibly producing fertile offspring. Between 1917 and 1950, brook trout were stocked in many streams and lakes in Southeast Alaska. Since then, they have disappeared from all but about 20 lakes. Much of the brook trout stocking occurred in areas already occupied with native Dolly Varden. No genetic studies have been performed to evaluate the impact these brook trout may have had on Dolly Varden populations. Introduction of other salmonids through barrier removal or aquaculture practices could increase competition for resources.

Overutilization Concerns

There is currently little concern regarding over utilization of Dolly Varden in Alaska. In the past there have been concerns for localized stocks around larger communities. These concerns have lead to the adoption of regulations reducing bag and possession limits. Monitoring of angler catch and harvest in these areas should continue.

Oil and Gas Development Concerns

Natural resource development may present significant challenges for the health of many Dolly Varden populations. In Alaska, oil and gas exploration occurs on a large scale on the North Slope, and development of mineral extraction projects are beginning on the Alaska Peninsula. As resource development increases in Alaska, environmental monitoring and utilization of mechanisms to protect fish habitats will continue to be important to minimize impacts to Dolly Varden populations.

Dolly Varden (*Salvelinus malma*)

Opportunities and Strategies for Improving Dolly Varden Status:

- Restoration of disturbed habitat following mining or other human activities.
- Removal of barriers to migration caused by human activities.
- Obtain reservations of water to protect and maintain existing populations of Dolly Varden.
- Genetic studies to identify and better define origins of mixed-stocks of Dolly Varden

Population surveys, genetic analyses, and fish population manipulation:

- Conduct stock assessments of Dolly Varden populations utilized by subsistence fisheries.
- Use mixed-stock analysis to obtain stock-specific information to further identify important overwintering aggregates.
- Maintain and enforce existing regulatory statutes (fishing regulations, water use, land management, etc.).
- Use stock assessment tools like radio and satellite telemetry and mark/recapture experiments to better understand their movements and populations dynamics.

Key Actions:

Continue management regulations to maintain current distribution
Characterize, conserve, and monitor genetic diversity of Dolly Varden.
Develop methodology and implement standardized surveys and genetic analyses.
Locate and assess genetically unique populations.
Minimize potential effects of resource development.
Conduct periodic stock status assessments on exploited populations.
Attempt to understand the degree to which western Alaska Dolly Varden interact with Russian Far East Dolly Varden, and consequently their associated habitats and fishing pressures.

Habitat Manipulations:

Key Actions:

Protect existing habitat to maintain distribution.
Secure reservations of water to protect Dolly Varden habitat.
Monitor potential climate change effects on habitat.

Regulatory and Administrative Actions:

Harvest regulations and collecting reliable harvest data to maintain sustainable harvests will be an important component of maintaining the health of Dolly Varden populations. In addition, working with other entities to maintain appropriate regulations for prevention of disease, water quality impairment, and habitat disturbance are important considerations.

Key Actions:

Maintain and protect Dolly Varden habitat from degradation by achieving compliance with existing habitat protection laws, policies, and guidelines.
Enforce regulatory mechanisms that prevent negative impacts associated with subsistence users and recreational angling.
Identify and protect unique genetic populations of Dolly Varden.

Recommended Actions to improve the status of Dolly Varden:

1. Conduct fish surveys to identify and document distribution of Dolly Varden
2. Conduct genetic analysis to evaluate and identify unique stocks of Dolly Varden.
3. Maintain and enforce regulatory actions related to water and land use, as well as sport and subsistence fisheries.
4. Describe marine movements, feeding behavior, and use of Russian Far East freshwaters.

Dolly Varden (*Salvelinus malma*)

Completed or on-going WNTI Projects^a

- 1. Protect Coastal Cutthroat Habitat via Water Reservations in SE AK (71440-2009-916).**
- 2. Protect Coastal Cutthroat Habitat in SE Alaska Water reservations Phase II (71440-2012-938).**

^a Both Dolly Varden and kokanee habitat will be protected by obtaining water reservations under these coastal cutthroat trout projects.

References:

- Armstrong, R. H. and J. E. Morrow. 1980. The Dolly Varden charr, *Salvelinus malma*. Pages 99-140 in Balon, E., editor. Charrs: salmonid fishes of the genus *Salvelinus*. Dr. W. Junk Publishers, The Hague, The Netherlands.
- Crane, P., V. Brykov, F. DeCicco, T. Viavant, M. Lisac, and J. Wenburg. 2004. Emerging baselines to estimate the migration patterns of Dolly Varden char nearshore and on the high-seas. NPAFC Technical Report No. 5, pgs 91-93.
- Crane, P., A. DeCicco, W. Spearman, and J. Wenburg. 2005. Genetic diversity of Dolly Varden populations in Norton and Kotzebue Sounds. U. S. Fish and Wildlife Service, Alaska Fisheries Technical Report Number 80.
- DeCicco, A. L. 1997. Movements of postsmolt anadromous Dolly Varden in Northwestern Alaska. American Fisheries Society Symposium 19:175:183.
- Everett, R. J., R. L. Wilmont, and C. C. Krueger. 1997. Population genetic structure of Dolly Varden from Beaufort Sea drainages of northern Alaska and Canada. American Fisheries Society Symposium 19:240-249.



This publication was funded (or partially funded) by Federal Aid to Sportfish Restoration Funds through the Multistate Conservation Grant Program (Grant WY M-8-P), a program supported with funds from the Wildlife and Sport Fish Restoration Program of the U.S. Fish and Wildlife Service and jointly managed with the Association of Fish and Wildlife Agencies, 2006-9.