

## Abstracts - Winter Reports

### Winter Conditions on the Nechako River 1987-1988 (M88-6)

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Nechako River hydrologic data for the winter of 1987-88 were collected using thermographs, dataloggers, local ice observers and overview flights of ice conditions.

Using air temperature as an index of severity of winter, 1987-88 was the 6th mildest winter in 50 years of record. This continues the recent pattern of milder winters, with 6 of the 8 mildest winters in the 50 year record occurring in the last 12 years. Observations of water temperature and ice conditions are discussed in the long term context based on this index of winter severity.

Monthly average flows in the Nechako River at Irvine's varied between 30.7 and 31.6 m<sup>3</sup>/s from November to March. Input from the Nautley River ranged on average from 8.0 to 10.0 m<sup>3</sup>/s. Winter discharges at Vanderhoof ranged from 40.5 to 45.5 m<sup>3</sup>/s.

Water temperatures were recorded at three locations on the Upper Nechako River: Cheslatta Falls (km 9); Irvine's (km 19); and Greer Creek (km 44). At Irvine's, temperatures dropped from an average of 5.9°C in November to 0.2°C by late December. At Greer Creek, mean monthly water temperatures were slightly lower than those at Irvine's, ranging from 1.6°C in December to 0.0°C in February. Freezing water temperatures were recorded until late February in the upper river area between Cheslatta Falls and Greer Creek, followed by a gradual increase in temperatures in March. Mean winter monthly water temperatures at Irvine's were above the long term average (1980-88) recorded at this station.

Ice observations, using both overview flights of the entire river and daily observations, indicated that the milder than average air and water temperatures resulted in a shorter ice regime at Irvine's than that observed in colder winters. However, the duration of a full ice cover at Vanderhoof was 6 days longer than the long term average, based on 33 years of record. An ice cover persisted at Vanderhoof from November 16, 1987 to April 4, 1988. Duration of full ice cover at Fort Fraser was from December 14, 1987 to March 3, 1988. At Irvine's, ice cover persisted from January 1 to 12, 1988 and from January 30 to February 13, 1988. Ice conditions at Irvine's, near the upstream limit of ice cover formation, demonstrated the greatest response to annual variation in meteorological conditions.

### Winter Conditions on the Nechako River 1988-1989 (M88-8)

Prepared by S.P.Wilkins (Sigma Engineering Ltd.) and Gail Faulkner (DFO) March 1999

Nechako River hydrologic data for the winter of 1988-89 were collected using thermographs, dataloggers, local ice observers and overview flights of ice conditions.

Using air temperature as an index of severity of winter, 1988-89 was the 20th mildest winter in 51 years of record. This breaks the recent pattern of milder winters, in which 5 of the 8 warmest winters in the 51 year record have occurred in the last 9 years. Observations of water temperature and ice conditions are discussed in the long term context based on this index of winter severity.

Monthly average flows in the Nechako River at Irvine's varied between 28.9 and 31.8 m<sup>3</sup>/s from November to March. Input from the Nautley River ranged on average from 8.5 to 12.6 m<sup>3</sup>/s. Winter discharges at Vanderhoof ranged from 38.7 to 48.5 m<sup>3</sup>/s.

Water temperatures were recorded at three locations on the Upper Nechako River: Cheslatta Falls (km 9); Irvine's (km 19); and Greer Creek (km 44). At Irvine's, temperatures dropped from an average of 5.1°C in November to 1.5°C in December and reached 0.0°C by late January. Freezing water temperatures were recorded until late February in the upper river area between Irvine's and Greer Creek, followed by a gradual increase in temperatures in March. Mean monthly water temperatures at Irvine's for November, December and January were slightly higher than the 9 year average (1980-89) recorded at this station; however, February and March water temperatures were slightly lower. Note: Greer Creek water temperatures were not properly calibrated.

Ice observations, using both overview flights of the entire river and daily observations, indicated that the slightly colder than average air and water temperatures in February and March resulted in an increased ice cover at Irvine's compared with previous years. The ice cover at Irvine's, persisted from February 1 to 16, 1989. The duration of full ice cover at Vanderhoof was 10 days longer than the long term average, based on 34 years of record. An ice cover persisted at Vanderhoof from November 24, 1988 to April 18, 1989. Duration of full ice cover at Fort Fraser was from November 28 to December 2, 1988 and from December 9, 1988 to April 13, 1989. Ice conditions at Irvine's, near the upstream limit of ice cover formation, demonstrated the greatest response to annual variation in meteorological conditions, whereas Vanderhoof had relatively stable ice conditions.

Winter Conditions on the Nechako River 1989-1990 (M89-4)

Prepared by S.P.Wilkins (Sigma Engineering Ltd.) and Gail Faulkner (DFO) March 1999

Nechako River hydrologic data for the winter of 1989-90 were collected using thermographs, dataloggers, local ice observers and overview flights of ice conditions.

Using air temperature as an index of severity of winter, 1989-90 was the 6th mildest winter in 52 years of record. This continues the recent pattern of a series of milder winters over the last

10 years in which 6 of the 9 mildest winters over the last 52 years of record have occurred. Observations of water temperature and ice conditions are discussed in the long term context based on this index of winter severity.

Monthly average flows in the Nechako River at Irvine's varied between 31.1 and 34.5 m<sup>3</sup>/s from November to March. Input from the Nautley River, over the winter, ranged on average from 9.0 to 13.0 m<sup>3</sup>/s. Winter discharges at Vanderhoof ranged from 43.8 to 51.6 m<sup>3</sup>/s.

Water temperatures were recorded at three locations on the Upper Nechako River: Cheslatta Falls (km 9); Irvine's (km 19); and Greer Creek (km 44). At Irvine's, temperatures dropped from an average of 5.2°C in November to 2.2°C in December and reached 0.0°C by late January. Freezing water temperatures were recorded in the upper river area between Cheslatta Falls and Greer Creek until late February, followed by a gradual increase in temperatures in March. Mean monthly water temperatures at Irvine's for all winter months were slightly higher than the or equal to the long term average (1980-90) recorded at this station.

Ice observations, using both overview flights of the entire river and daily observations, indicated that the warmer than average air and water temperatures resulted in an ice regime similar to that observed in milder winters at Irvine's. The duration of ice cover at Vanderhoof was 12 days longer than the long term average, based on 35 years of record. An ice cover persisted at Vanderhoof from November 14, 1989 to April 10, 1990. Duration of full ice cover at Fort Fraser was from December 19, 1989 to March 27, 1990. At Irvine's, ice cover persisted from February 17 to 20, 1990. Ice conditions at Irvine's, near the upstream limit of ice cover formation, demonstrated the greatest response to annual variation in meteorological conditions.

#### Winter Conditions on the Nechako River 1990-1991 (M90-4)

Prepared by Gail Faulkner, Department of Fisheries and Oceans March 1999

Nechako River hydrologic data for the winter of 1990-91 were collected using thermographs, dataloggers, local ice observers and overview flights of ice conditions.

Using air temperature as an index of severity of winter, 1990-91 was the 33rd coldest winter in 53 years of record. This continues the recent pattern of a series of milder winters over the last 11 years in which 8 of the 11 mildest winters over the last 53 years of record have occurred. Observations of water temperature and ice conditions are discussed in the long term context based on this index of winter severity.

Monthly average flows in the Nechako River at Irvine's varied between 23.5 and 30.0 m<sup>3</sup>/s from November to February. Input from the Nautley River, over the winter, ranged on average from 8.6 to 9.5 m<sup>3</sup>/s. Winter discharges at Vanderhoof ranged from 33.2 to 55.1 m<sup>3</sup>/s.

Water temperatures were recorded at three locations on the Upper Nechako River: Cheslatta Falls (km 9); Irvine's (km 19); and Greer Creek (km 44). At Irvine's, temperatures dropped from an average of 3.2°C in November to 0.9°C in December and remained at approximately 0.5°C to 1.5°C from January to March. Water temperatures gradually increased at the end of March. Mean monthly water temperatures at Irvine's for all winter months, except February, were lower than the long term average (1980-91) recorded at this station.

Ice observations, using both overview flights of the entire river and daily observations, indicated that the cooler air and water temperatures resulted in an ice regime similar to that observed in colder winters at Irvine's. The duration of ice cover at Vanderhoof was 20 days longer than the long term average, based on 36 years of record. An ice cover persisted at Vanderhoof from November 5, 1990 to April 10, 1991. Duration of full ice cover at Fort Fraser was from December 18, 1990 to March 9, 1991. At Irvine's, there was no full ice cover during the winter of 1990-91.

#### Winter Conditions on the Nechako River 1991-1992 (M91-4)

Prepared by Gail Faulkner, Department of Fisheries and Oceans March 1999

Nechako River hydrologic data for the winter of 1991-92 were collected using thermographs, dataloggers, local ice observers and overview flights of ice conditions.

Using air temperature as an index of severity of winter, 1991-92 was the mildest winter in 54 years of record. This continues the recent pattern of a series of milder winters over the last 10 years in which 6 of the 9 mildest winters over the last 54 years of record have occurred. Observations of water temperature and ice conditions are discussed in the long term context based on this index of winter severity.

Monthly average flows in the Nechako River at Irvine's varied between 31.2 and 33.5 m<sup>3</sup>/s from November to March. Input from the Nautley River, over the winter, ranged on average from 9.1 to 14.0 m<sup>3</sup>/s. Winter discharges at Vanderhoof ranged from 37.7 to 68.0 m<sup>3</sup>/s.

Water temperatures were recorded at three locations on the Upper Nechako River: Cheslatta Falls (km 9); Irvine's (km 19); and Greer Creek (km 44). At Irvine's, temperatures dropped from an average of 4.0°C in November to 1.9°C in December, reaching approximately 1.0°C by mid-January. An increase in water temperatures to 2.0°C had occurred by mid-March. Mean monthly water temperatures at Irvine's from December to March were slightly higher than the long term average (1980-92) recorded at this station.

Daily ice observations indicated that the warmer than average air and water temperatures resulted in an ice regime similar to that observed in milder winters at Irvine's. The duration of ice cover at Vanderhoof was 1.5 days shorter than the long term average, based on 37 years of record. An ice cover persisted at Vanderhoof from October 27 to November 10, 1991 and from

December 14, 1991 to March 4, 1992. At Irvine's, ice observations were inadequate; however, the WSC gauge suggests that there were no ice conditions this winter.

#### Winter Conditions on the Nechako River 1992-1993 (M92-4)

Prepared by Gail Faulkner, Department of Fisheries and Oceans March 1999

Nechako River hydrologic data for the winter of 1992-93 were collected using thermographs, dataloggers, local ice observers and overview flights of ice conditions.

Using air temperature as an index of severity of winter, 1992-93 was the 27th mildest winter in 55 years of record. This breaks the recent pattern of a series of milder winters over the last 10 years. Over this period 5 of the 9 mildest winters during the 55 years of record have occurred. Observations of water temperature and ice conditions are discussed in the long term context based on this index of winter severity.

Monthly average flows in the Nechako River at Irvine's varied slightly between 33.5 and 35.2 m<sup>3</sup>/s from November to March. Input from the Nautley River ranged on average from 7.7 to 11.4 m<sup>3</sup>/s over the winter period. Winter discharge at Vanderhoof ranged from 43.6 to 49.6 m<sup>3</sup>/s.

Water temperatures were recorded at three locations on the Upper Nechako River: Cheslatta Falls (km 9); Irvine's (km 19); and Greer Creek (km 44). At Irvine's, temperatures dropped from an average of 4.6°C in November to 1.4°C in December, reaching 0.0°C by early December to early February depending on the particular location. Freezing water temperatures were recorded until late February, followed by a gradual increase in temperatures in March. Mean monthly water temperatures at Irvine's for all winter months, were higher than the long term average (1980-93) recorded at this station.

Ice observations, using both overview flights of the entire river and daily observations, indicated that the warmer than average air and water temperatures resulted in an ice regime similar to that observed in milder winters. The duration of ice cover at Vanderhoof was 7 days shorter than the long term average, based on 38 years of record. An ice cover persisted from January 14 to 20, 1993. Ice conditions at Irvine's, near the upstream limit of ice cover formation, demonstrated the greatest response to annual variation in meteorological conditions.