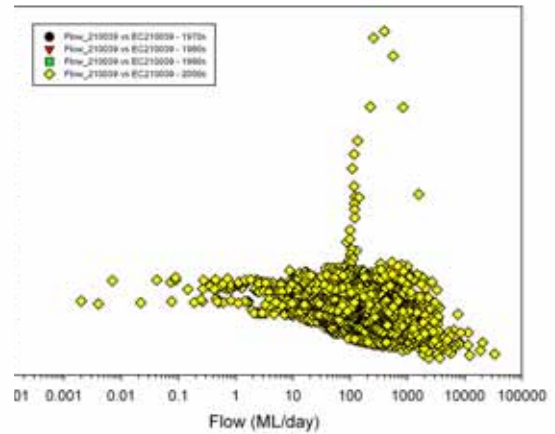
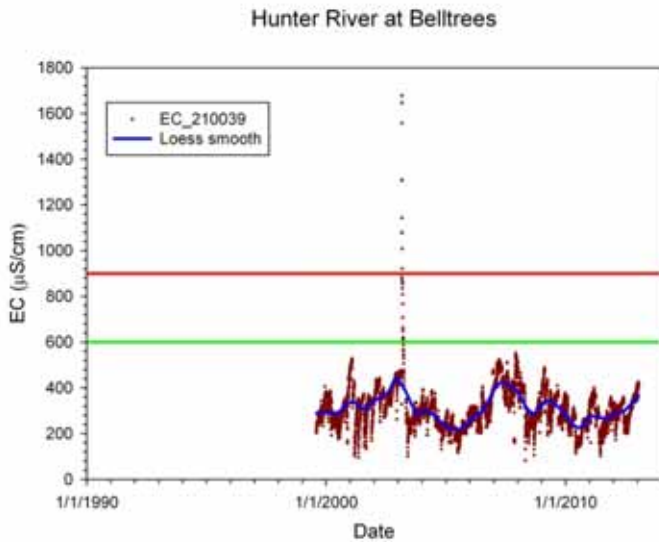


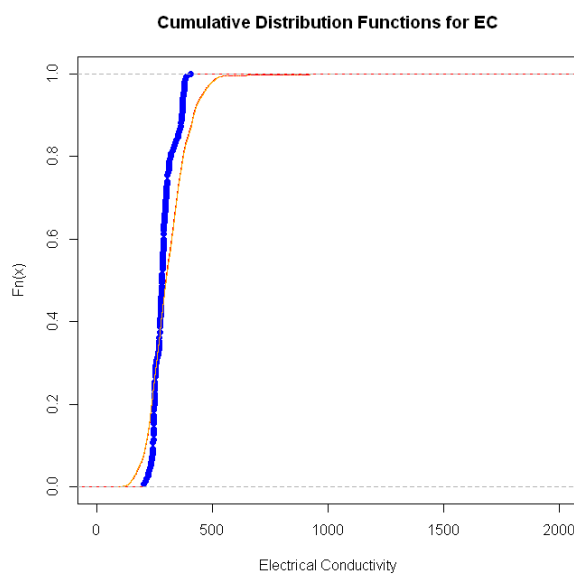
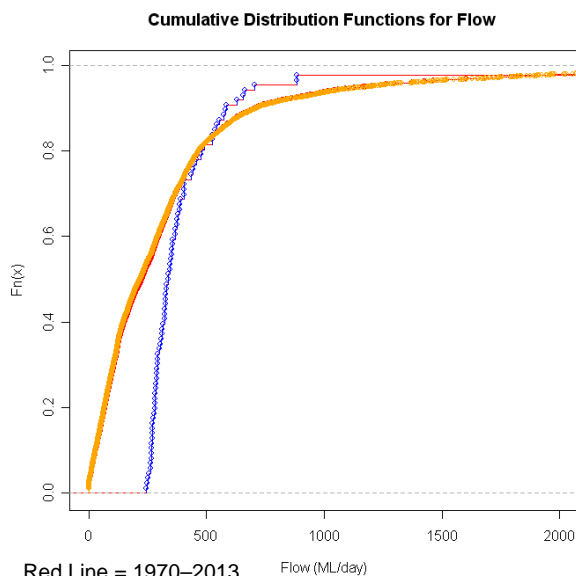
Appendix B: Long-term trends in flow and electrical conductivity

Hunter River stations

Station 210039 Hunter River at Belltrees



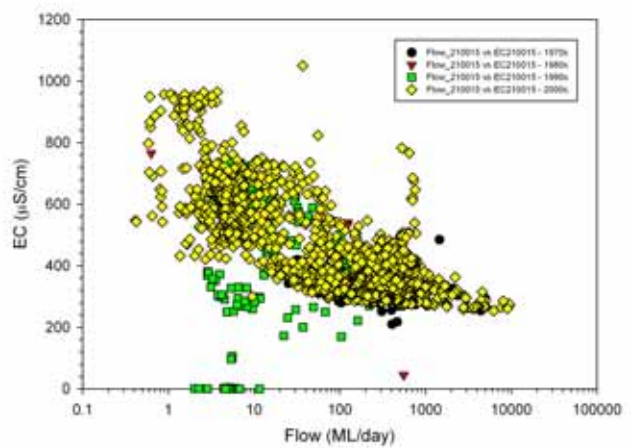
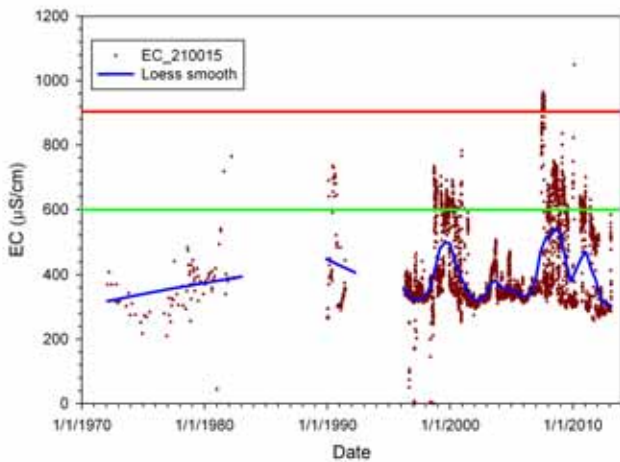
| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|---------------|--------------|---------------|-------|-------|
| Flow (ML/day) | 226.1 | NA | 338.8 | 218.7 |
| EC (µS/cm) | 299.7 | NA | 283 | 301.3 |



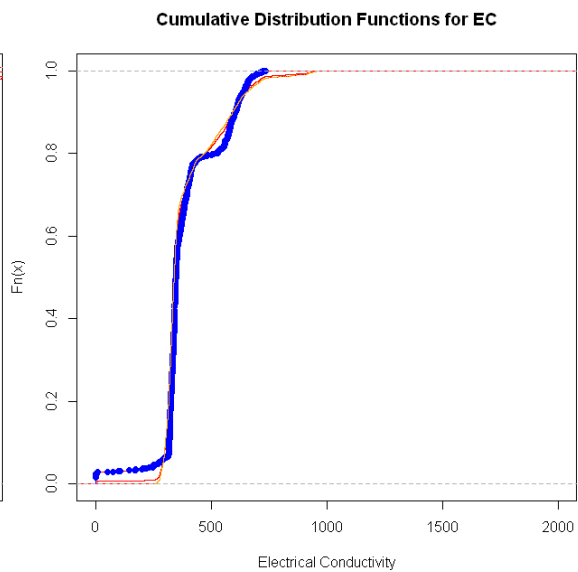
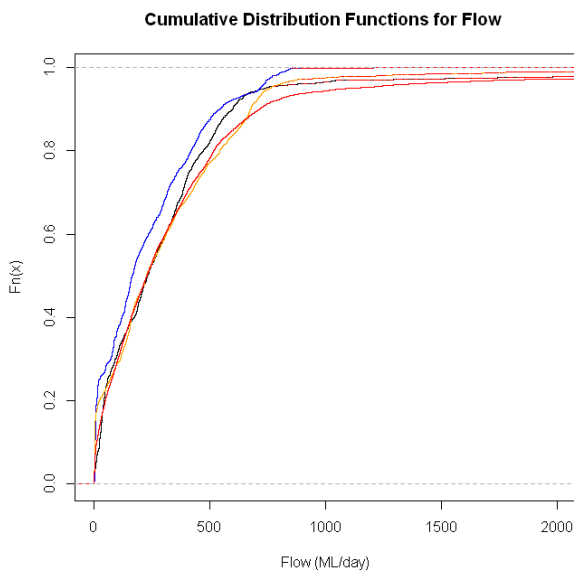
Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

Limited sampling at Belltrees during the 1970s to 1990s makes comparisons between periods difficult. At this point there appears to be no trend in conductivity levels at this site.

Station 210015 Hunter River at downstream Glenbawn Dam



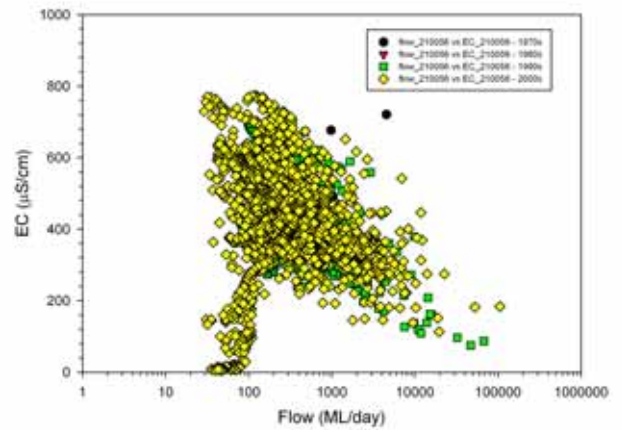
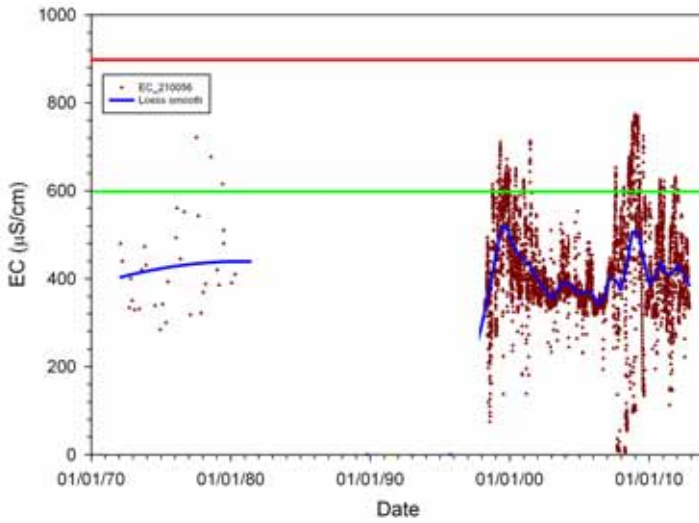
| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|-------------------------|--------------|---------------|--------|-------|
| Flow (ML/day) | 229.71 | 343.17 | 167.15 | 227.3 |
| EC ($\mu\text{S/cm}$) | 342 | 370 | 347.1 | 340.5 |



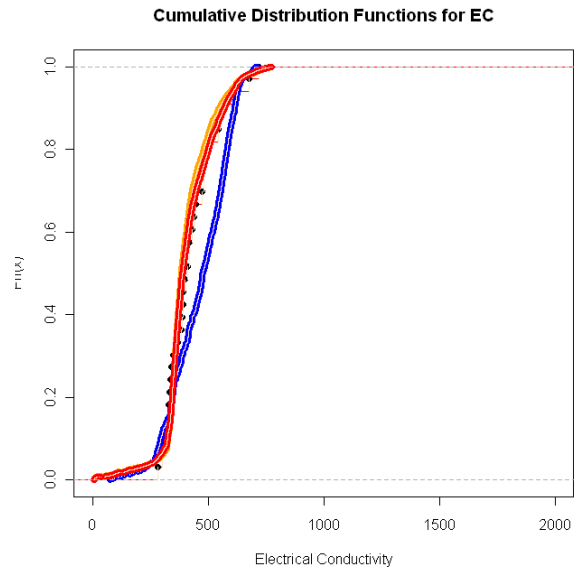
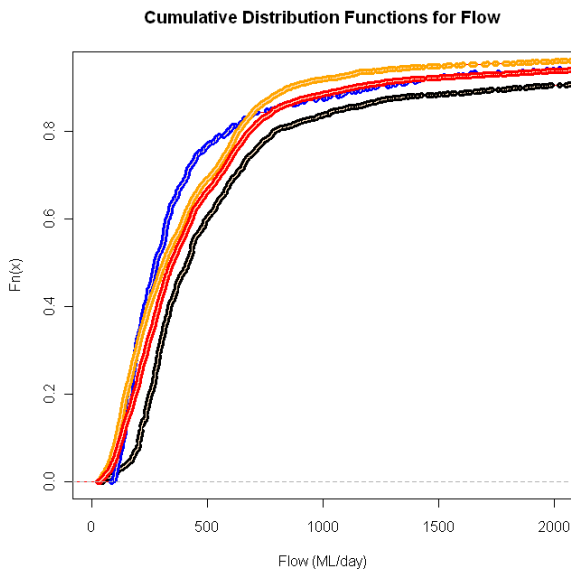
Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

Temporal variability in flow and EC levels downstream of Glenbawn Dam are noticeable, with flows in the 2000s generally being higher than in the 1970s & 1980s or 1990s. However, the distribution of EC levels does not appear to have changed markedly between time periods.

Station 210056 Hunter River at Aberdeen



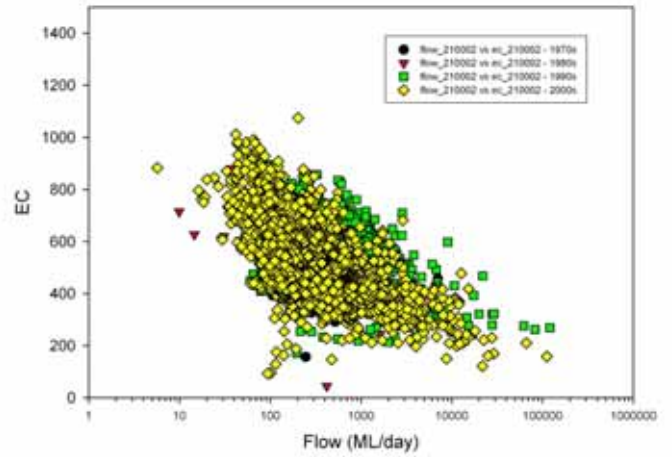
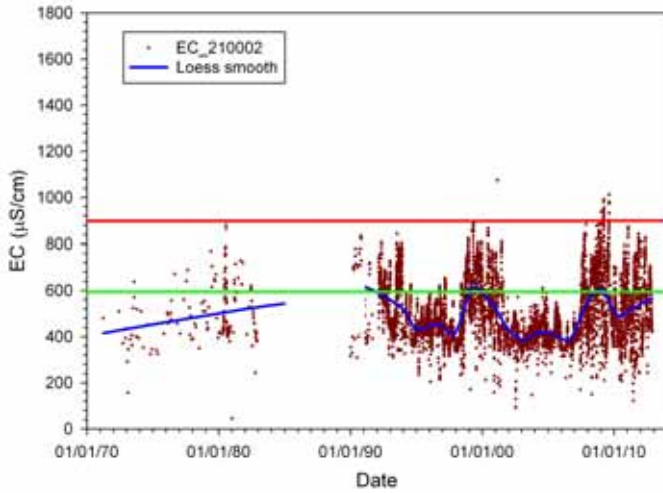
| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|-------------------------|--------------|---------------|-------|-------|
| Flow (ML/day) | 398.86 | 416.09 | 277.1 | 314.8 |
| EC ($\mu\text{S/cm}$) | 389.5 | 410 | 475.8 | 384 |



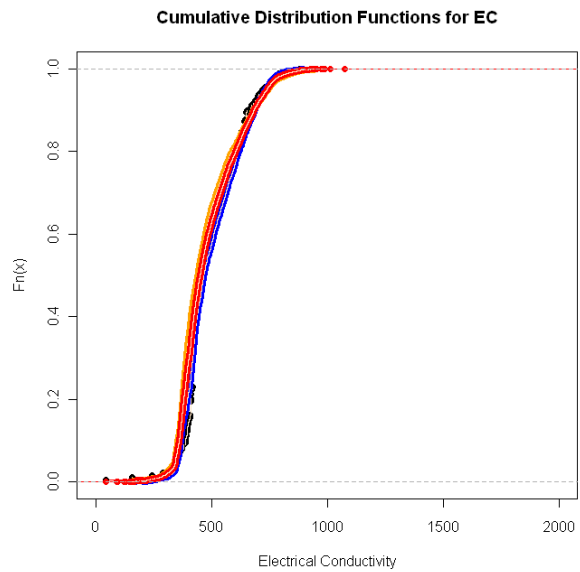
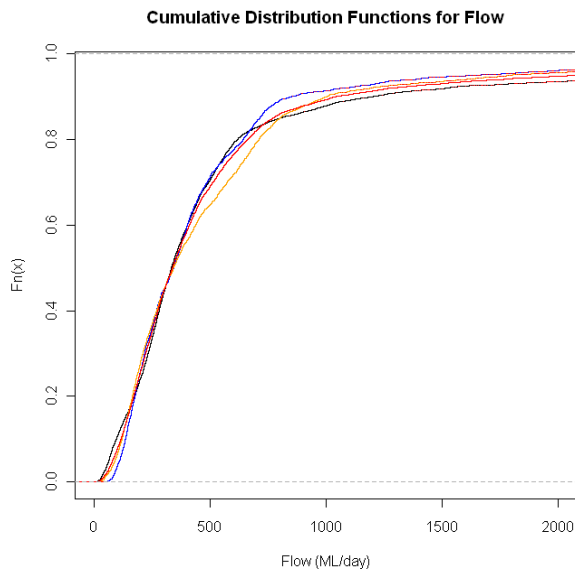
Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

Relatively limited EC data is available for the Hunter River at Aberdeen. Flows appear to be relatively similar between the 1990s and 2000s, although higher flows were recorded during the 1990s and increased medium flows were recorded in the 2000s, potentially as a result of river regulation. Even higher flows were recorded in the 1970s but there is a large gap in flow records between 1978 and 1998. Continuous EC records were only available from March 1998, but the distribution of EC records suggests slightly higher EC for the period monitored in the 1990s compared to those recorded in the 2000s. EC in the 1970s & 1980s was similar to the 2000s.

Station 210002 Hunter River at Muswellbrook Bridge



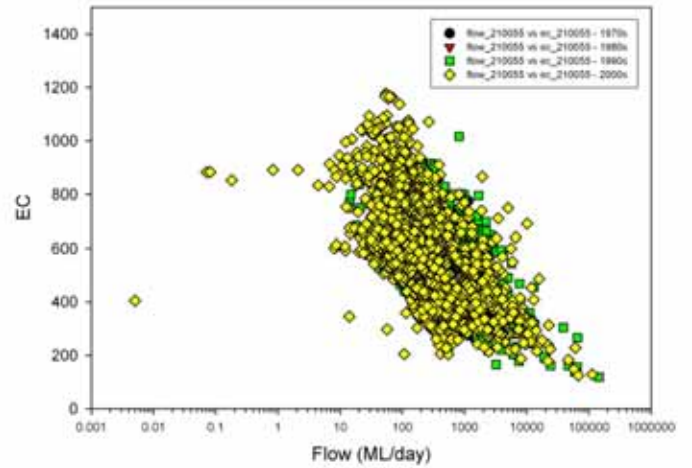
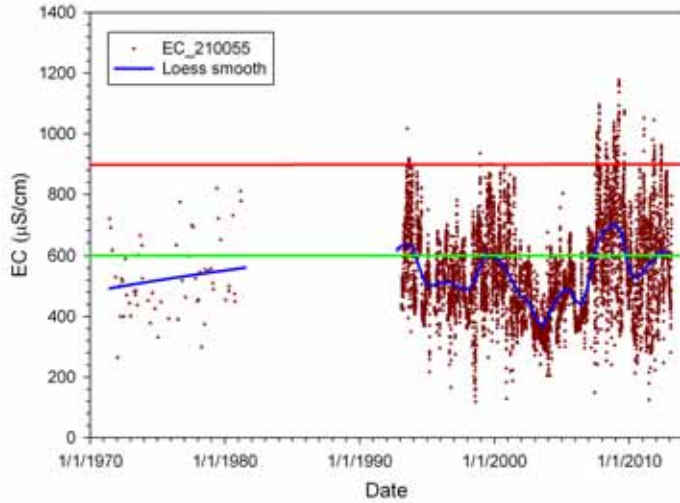
| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|---------------|--------------|---------------|-------|-------|
| Flow (ML/day) | 338.4 | 333.72 | 343.2 | 342.8 |
| EC (µS/cm) | 451.1 | 457 | 466.9 | 440.8 |



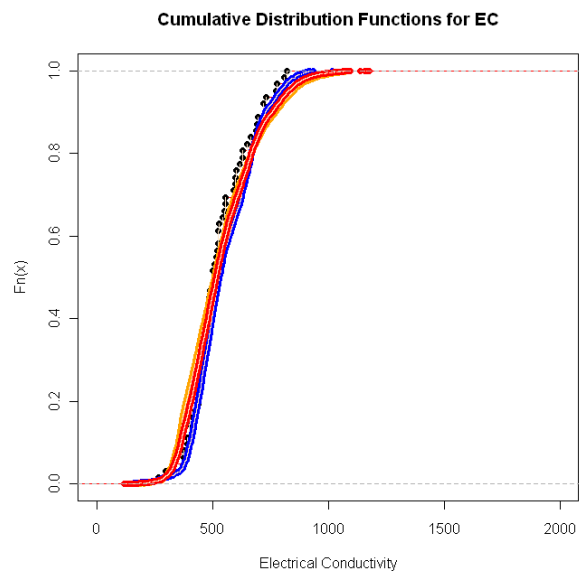
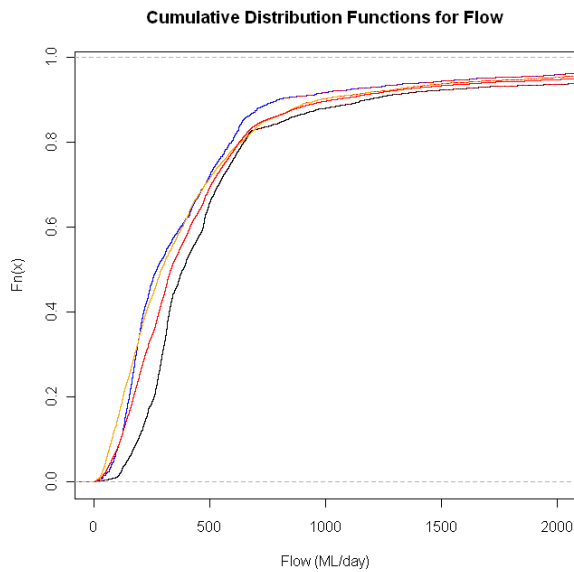
Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

Assessment of the distribution of flow and EC records for station 210002 over the various time periods showed relatively little change in either flow or EC. Median flow over the period 1970 to 2013 was 338.4 ML/day. Median EC over the period 1970 to 2013 was 451.1 µS/cm.

Station 210055 Hunter River at Denman



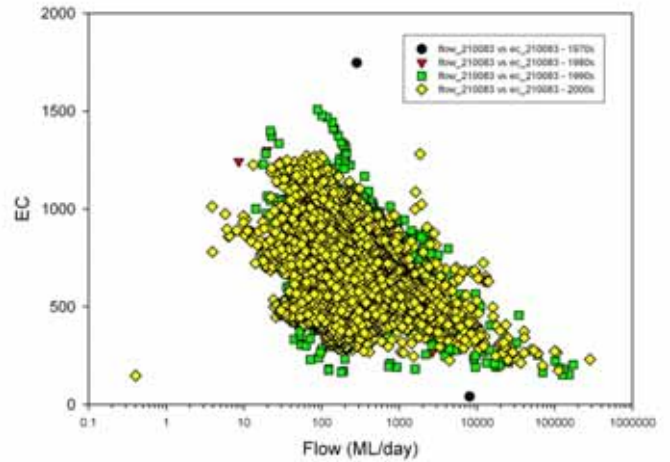
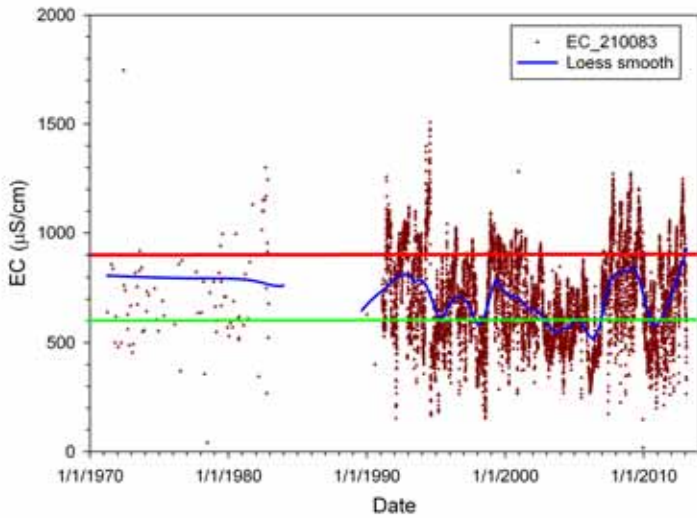
| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|--------------------------------|--------------|---------------|-------|-------|
| Flow (ML/day) | 333.1 | 383.4 | 272.5 | 291.9 |
| EC ($\mu\text{S}/\text{cm}$) | 515.5 | 500 | 529.2 | 509.4 |



Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

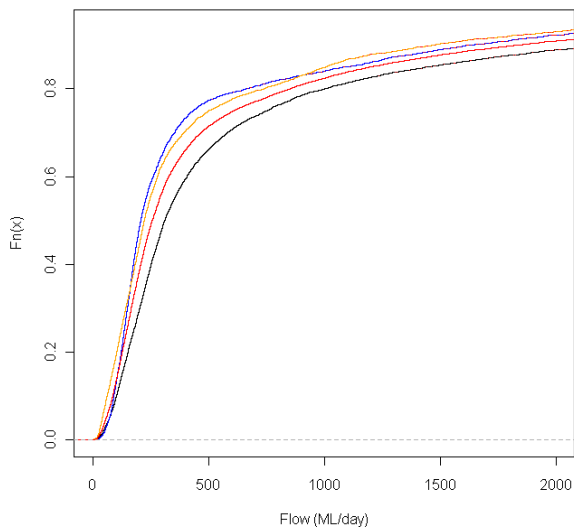
Assessment of the distribution of flow and EC records for station 210055 over the various time periods showed relatively little change. Slightly higher flows were recorded in the 1970s, however the distribution of EC levels was similar for all periods. There were fewer EC records for the 1970s & 1980s compared to more recent periods. Some EC levels exceeded the 900 $\mu\text{S}/\text{cm}$ level, usually associated with lower flow in the river. Median flow over the period 1970 to 2013 was 333.1 ML/day. Median EC over the period 1970 to 2013 was 515.5 $\mu\text{S}/\text{cm}$.

Station 210083 Hunter River at Liddell

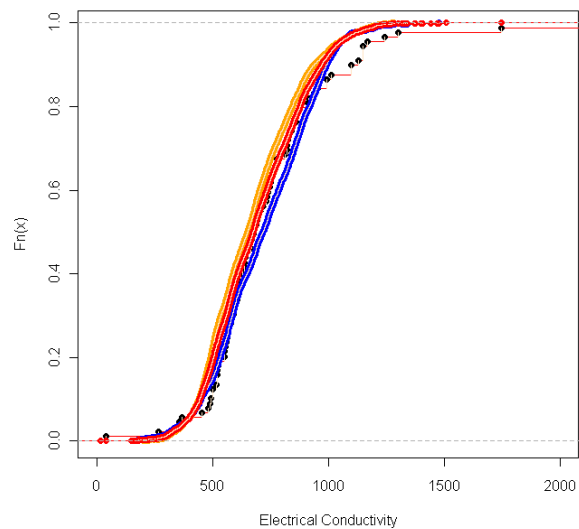


| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|--------------------------------|--------------|---------------|-------|-------|
| Flow (ML/day) | 257.1 | 311.7 | 207.2 | 223.5 |
| EC ($\mu\text{S}/\text{cm}$) | 675.7 | 681 | 717.6 | 652 |

Cumulative Distribution Functions for Flow



Cumulative Distribution Functions for EC

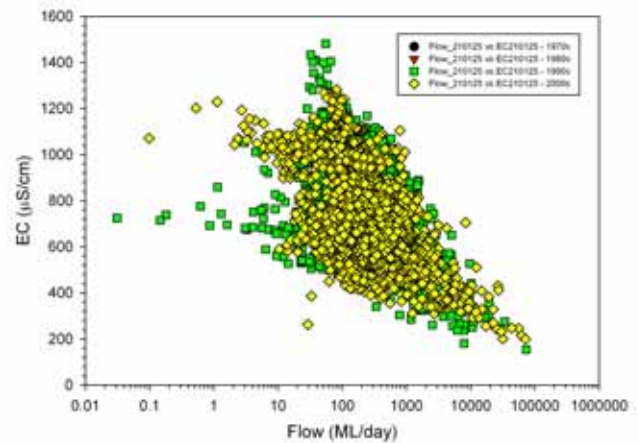
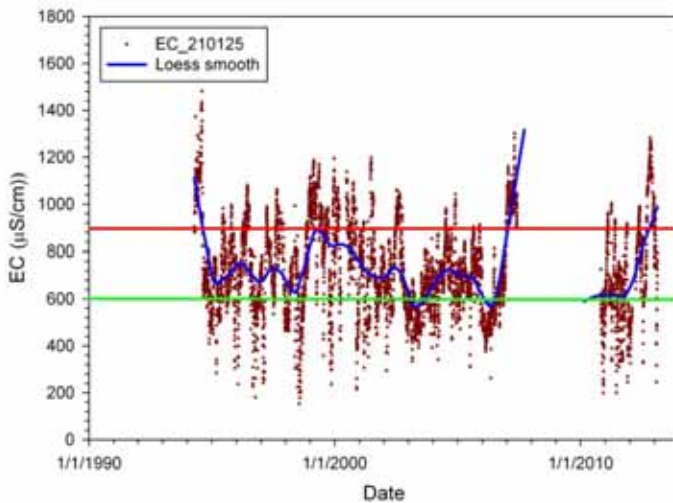


Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

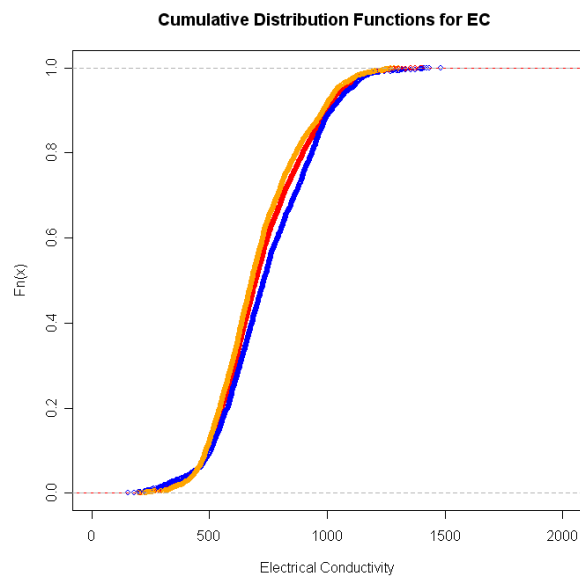
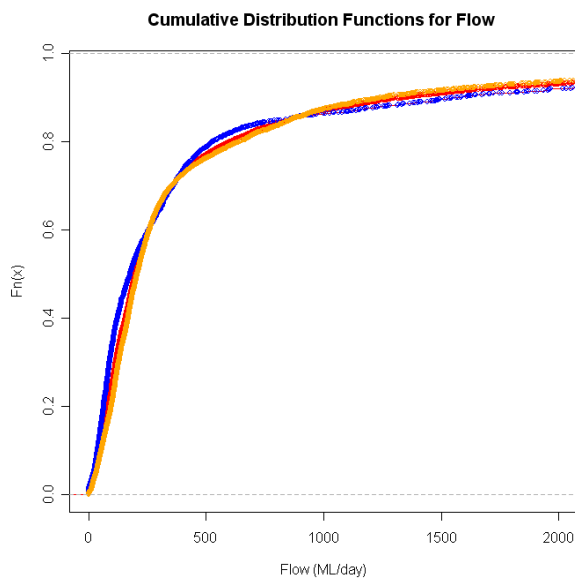
Assessment of the distribution of flow and EC records for station 210083 suggests higher flows in the 1970s & 1980s compared to the 1990s and 2000s. The distribution of EC levels was similar for most periods, however there appeared to be some higher EC levels in the 1970s & 1980s and EC levels in the 2000s were generally lower than in the 1990s. At times EC levels exceeded the 900 $\mu\text{S}/\text{cm}$ level for longer periods than at Denman. Again these higher EC levels were usually associated with lower flow in the river. Median flow over the period 1970 to 2013 was 257.1 ML/day. Median EC over the period 1970 to 2013 was 675.7 $\mu\text{S}/\text{cm}$.

Station 210125 Hunter River at upstream Bayswater Creek

Hunter River U/S Bayswater Creek



| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|-------------------------|--------------|---------------|-------|-------|
| Flow (ML/day) | 199.9 | NA | 176.8 | 207.3 |
| EC ($\mu\text{S/cm}$) | 698 | NA | 732.3 | 680.5 |

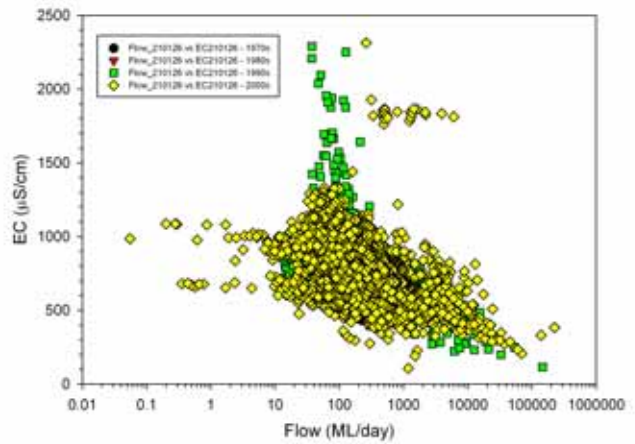
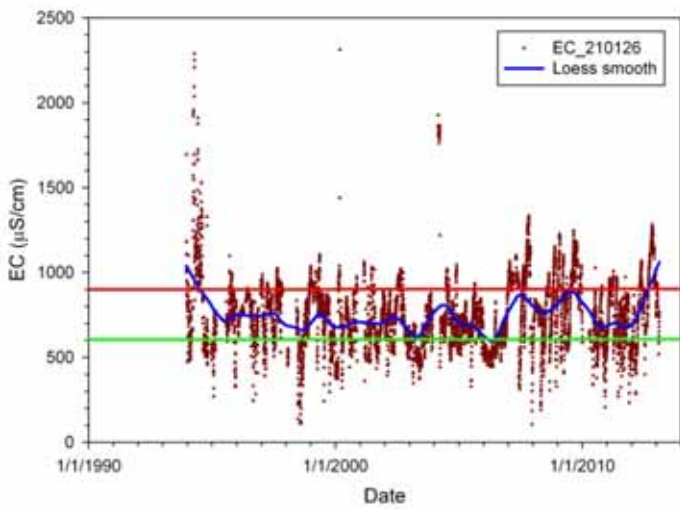


Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

Assessment of the distribution of flow and EC records for station 210125 suggests similar flows in the 1990s and 2000s. No flow or EC data were available at this site for the 1970s & 1980s. The distribution of EC levels was similar but EC levels in the 2000s were generally lower than in the 1990s. At times EC levels exceeded the 900 $\mu\text{S/cm}$ level. Median flow over the period 1990 to 2013 was 199.9 ML/day. Median EC over the period 1990 to 2013 was 698 $\mu\text{S/cm}$. This station was damaged during the 2007 floods and took a while to become fully operational again, explaining the gap in records in the late 2000s.

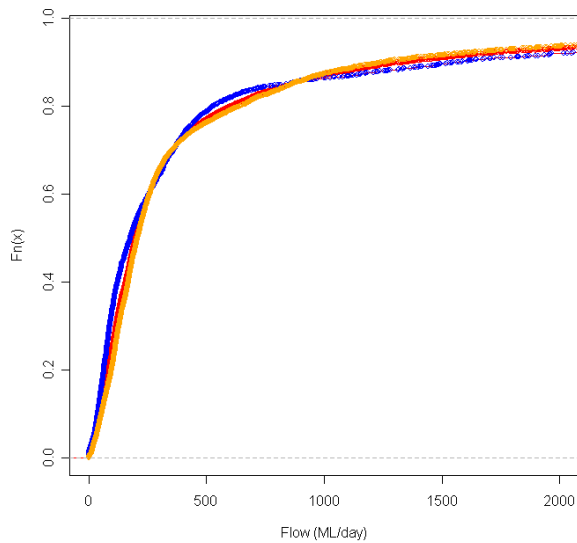
Station 210126 Hunter River at upstream Foy Brook

Hunter River U/S Foy Brook

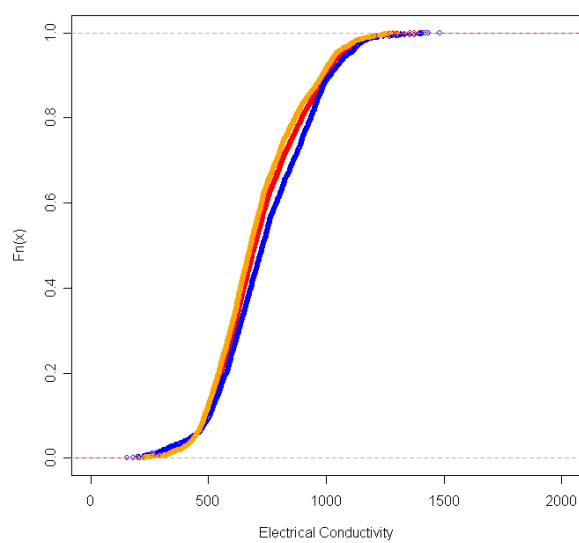


| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|--------------------------------|--------------|---------------|-------|-------|
| Flow (ML/day) | 224.3 | NA | 276.7 | 213.9 |
| EC ($\mu\text{S}/\text{cm}$) | 719 | NA | 758.1 | 705.4 |

Cumulative Distribution Functions for Flow



Cumulative Distribution Functions for EC

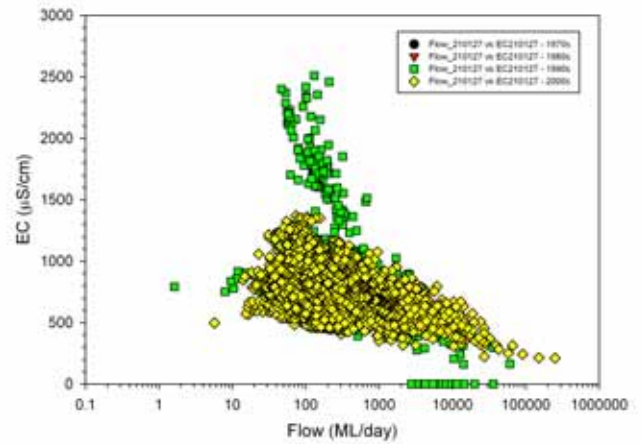
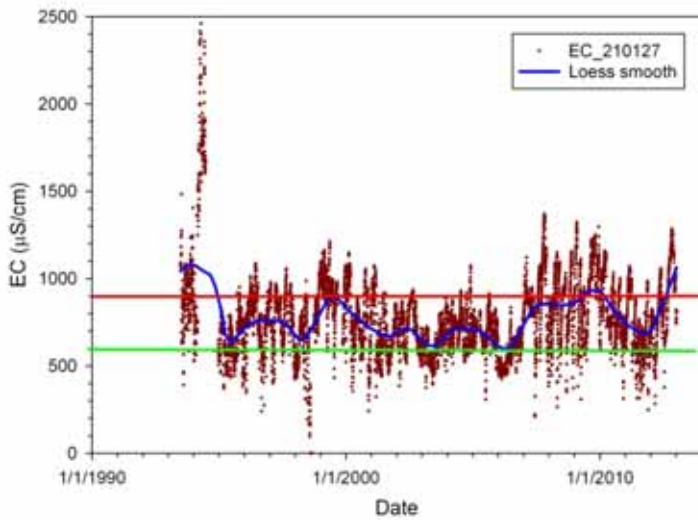


Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

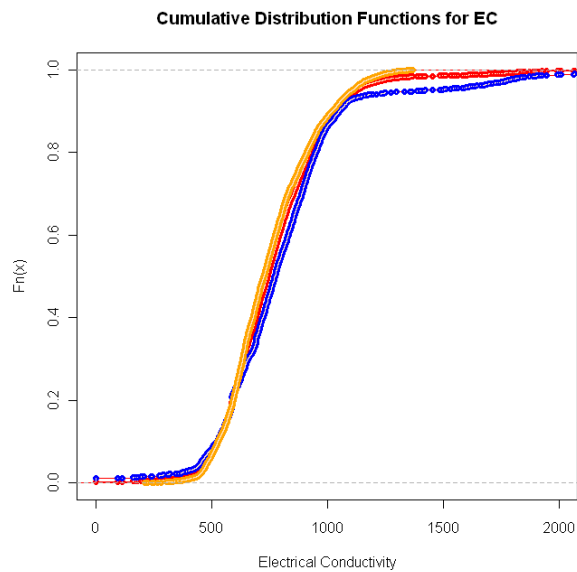
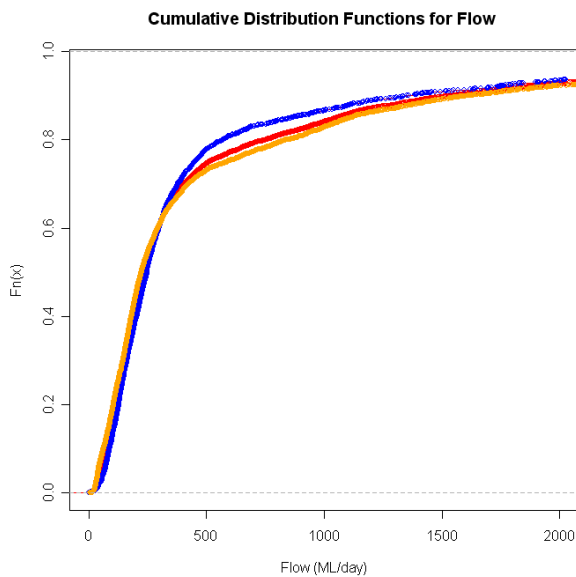
Assessment of the distribution of flow and EC records for station 210126 suggests similar flows in the 1990s and 2000s. No flow or EC data were available at this site for the 1970s & 1980s. The distribution of EC levels was also similar but EC levels in the 2000s were generally lower than in the 1990s. At times EC levels exceeded the 900 $\mu\text{S}/\text{cm}$ level. Median flow over the period 1990 to 2013 was 224.3 ML/day. Median EC over the period 1990 to 2013 was 719 $\mu\text{S}/\text{cm}$.

Station 210127 Hunter River at upstream Glennies Creek

Hunter River U/S Glennies Creek



| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|---------------|--------------|---------------|-------|-------|
| Flow (ML/day) | 232.9 | NA | 247.2 | 224.1 |
| EC (µS/cm) | 741.4 | NA | 774.3 | 726.5 |

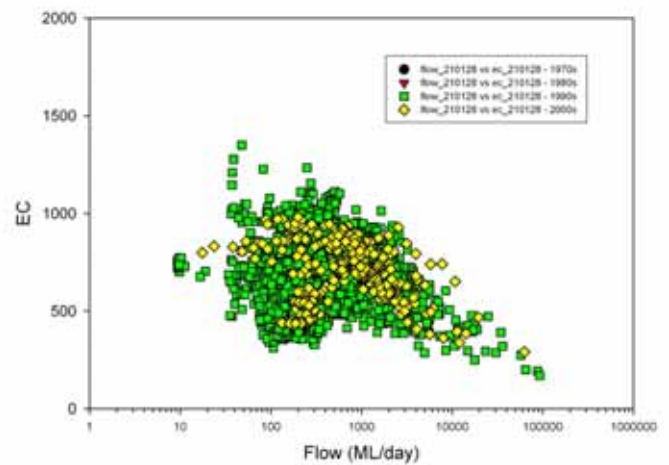
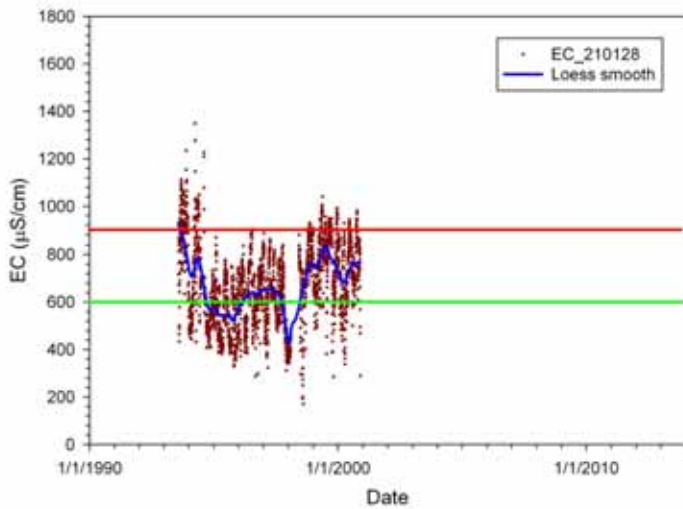


Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

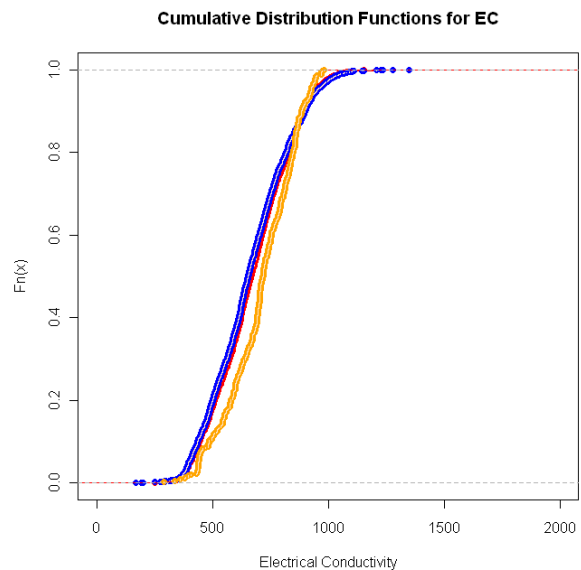
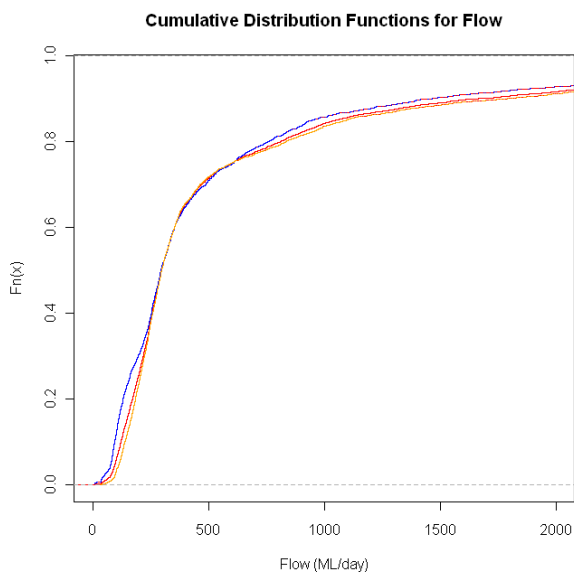
Assessment of the distribution of flow and EC records for station 210127 suggests similar flows in the 1990s and 2000s, but comparatively more high flows in the 2000s. No flow or EC data were available at this site for the 1970s & 1980s. The distribution of EC levels was similar but EC levels in the 2000s were generally lower than in the 1990s. At times EC levels exceeded the 900 µS/cm level. Median flow over the period 1990 to 2013 was 232.9 ML/day. Median EC over the period 1990 to 2013 was 741.4 µS/cm.

Station 210128 Hunter River at Maison Dieu

Hunter River at Maison Dieu



| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|--------------------------------|--------------|---------------|-------|-------|
| Flow (ML/day) | 297 | NA | 295 | 297.8 |
| EC ($\mu\text{S}/\text{cm}$) | 666 | NA | 653.8 | 719.3 |

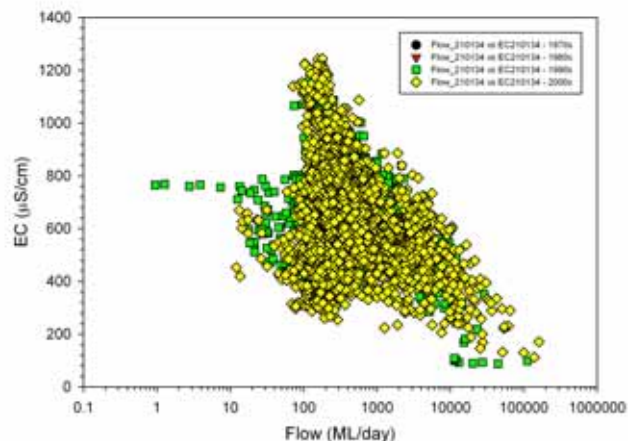
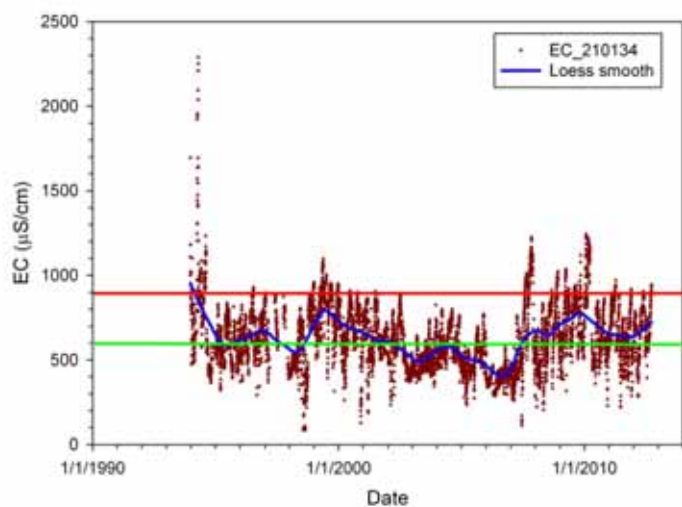


Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

Assessment of the distribution of flow and EC records for station 210128 suggests similar flows in the 1990s and 2000s. No flow or EC data were available at this site for the 1970s & 1980s. The distribution of EC levels was also similar but EC levels were only recorded between July 1993 and November 2000, making inter-decade comparisons less meaningful. At times EC levels exceeded the 900 $\mu\text{S}/\text{cm}$ level. Median flow over the period 1990 to 2013 was 297 ML/day. Median EC over the period 1993 to 2000 was 666 $\mu\text{S}/\text{cm}$.

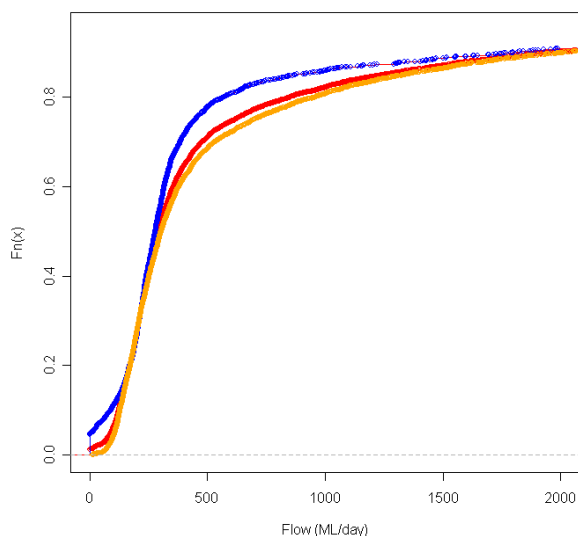
Station 210134 Hunter River at Long Point

Hunter River at Long Point

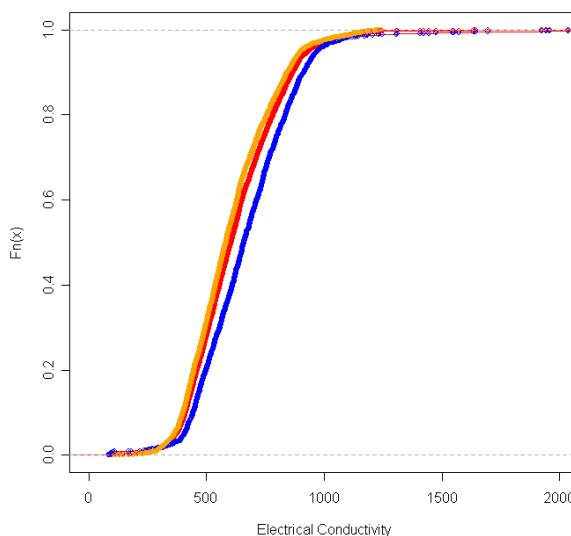


| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|---------------|--------------|---------------|-------|-------|
| Flow (ML/day) | 224.3 | NA | 276.7 | 213.9 |
| EC (µS/cm) | 719 | NA | 758.1 | 705.4 |

Cumulative Distribution Functions for Flow



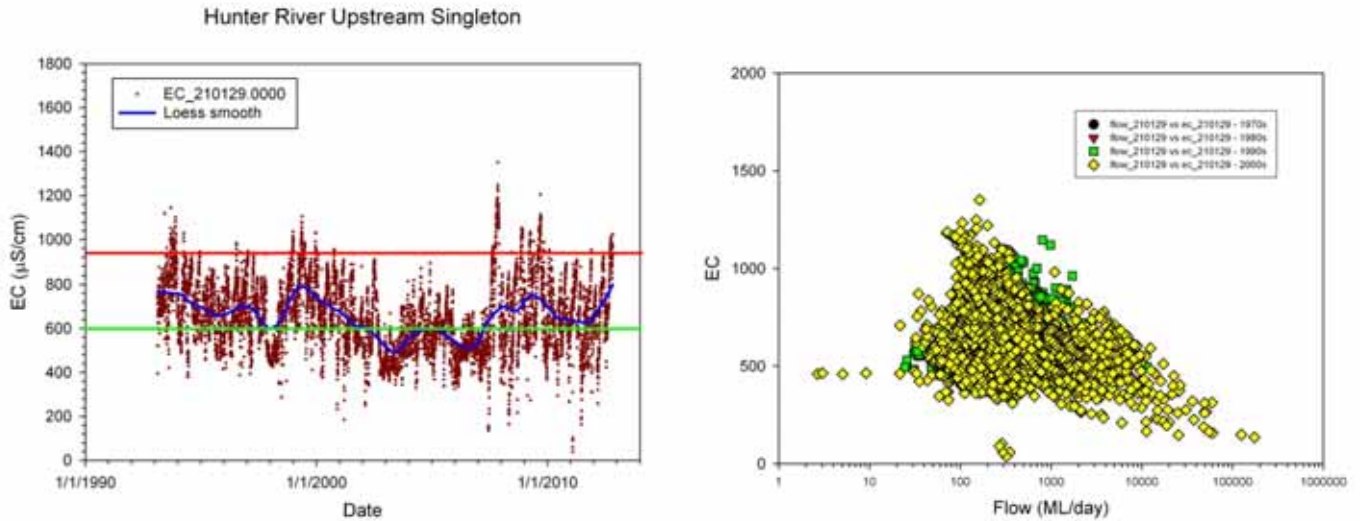
Cumulative Distribution Functions for EC



Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

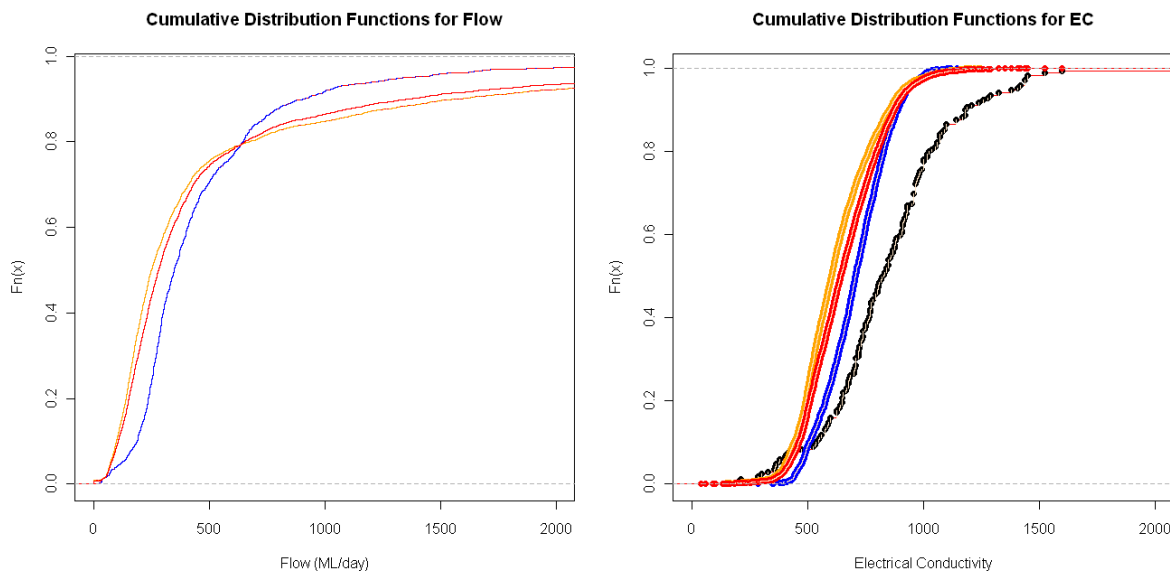
Assessment of the distribution of flow and EC records for station 210134 suggests higher flows in the 2000s compared to the 1990s. No flow or EC data were available at this site for the 1970s & 1980s. In contrast, EC levels in the 2000s were generally lower than in the 1990s. Fewer EC levels exceeded the 900 µS/cm level than at sites further upstream, potentially as a result of diluting flows from Glennies Creek. Median flow over the period 1990 to 2013 was 224.3 ML/day. Median EC over the period 1990 to 2013 was 719 µS/cm.

Station 210129 Hunter River at upstream Singleton



| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|---------------|--------------|---------------|-------|-------|
| Flow (ML/day) | 281.2 | 371* | 349 | 250.9 |
| EC (µS/cm) | 639.9 | 831* | 706.9 | 602.2 |

*Data from station 210001

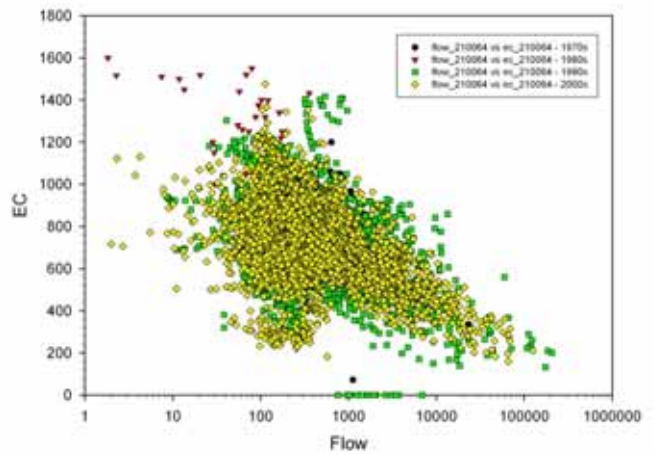
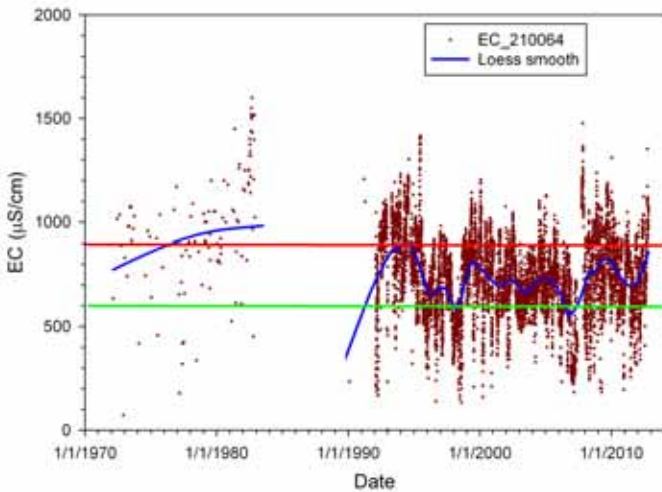


EC data for 1970s & 1980s from station 210001

Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

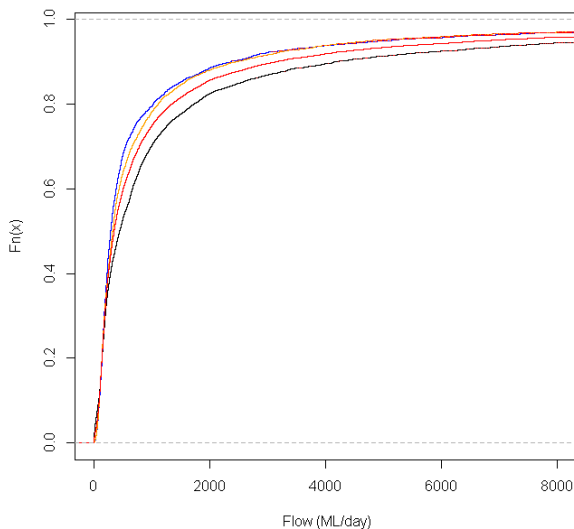
Assessment of the distribution of flow and EC records for station 210129 suggests higher small to medium flows in the 1990s compared to the 2000s; but more high flows in the 2000s. If data from the Singleton gauge (station 210001) are included, then flows were even higher (median = 371 ML/day) in the 1970s & 1980s. EC levels in the 2000s were generally lower than in the 1990s and much lower than EC levels measured at station 210001 in the 1970s & 1980s. Fewer EC levels exceeded the 900 µS/cm over the period 1990 to 2013. Median flow over the period 1990 to 2013 was 281.2 ML/day. Median EC over the period 1990 to 2013 was 639.9 µS/cm, much lower than the median EC level of 831 µS/cm recorded at station 210001 in the 1970s & 1980s.

Station 210064 Hunter River at Greta

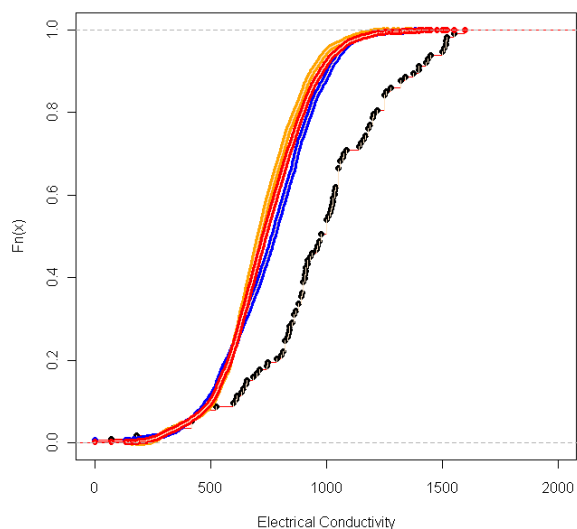


| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|---------------|--------------|---------------|-------|-------|
| Flow (ML/day) | 353 | 448 | 292.9 | 327.6 |
| EC (µS/cm) | 731.9 | 979 | 771.8 | 710.9 |

Cumulative Distribution Functions for Flow



Cumulative Distribution Functions for EC

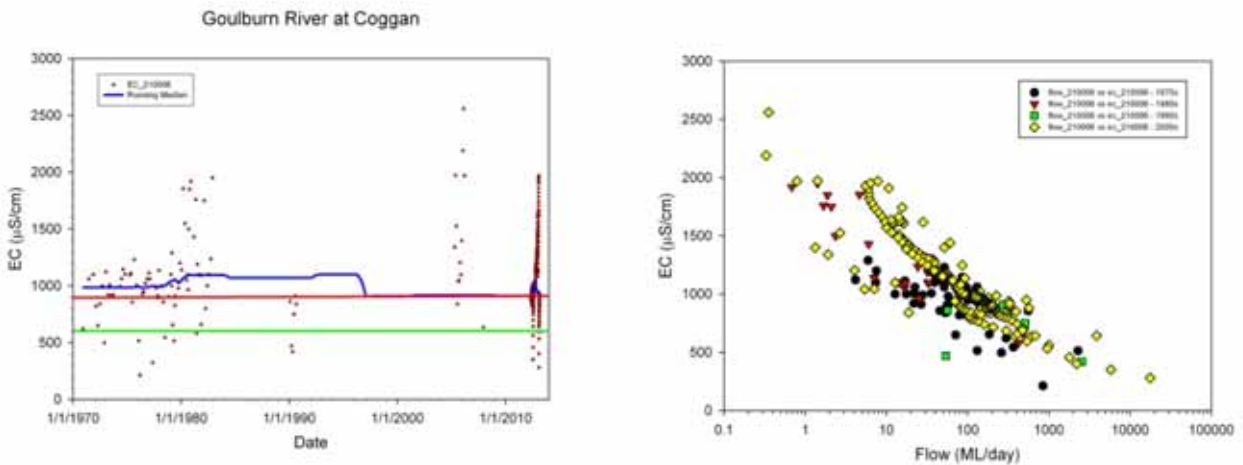


Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

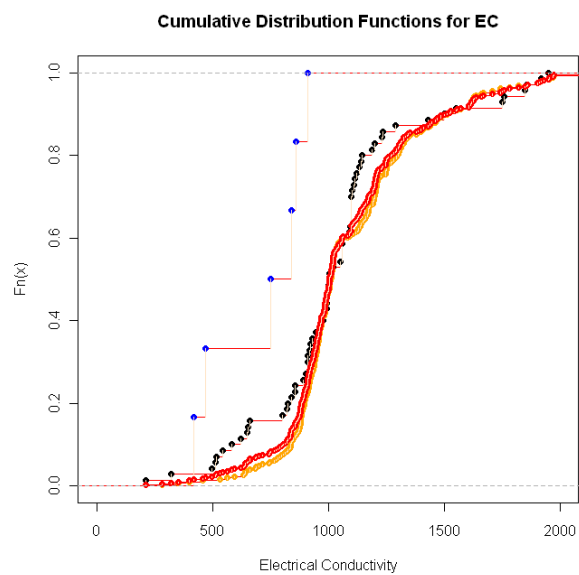
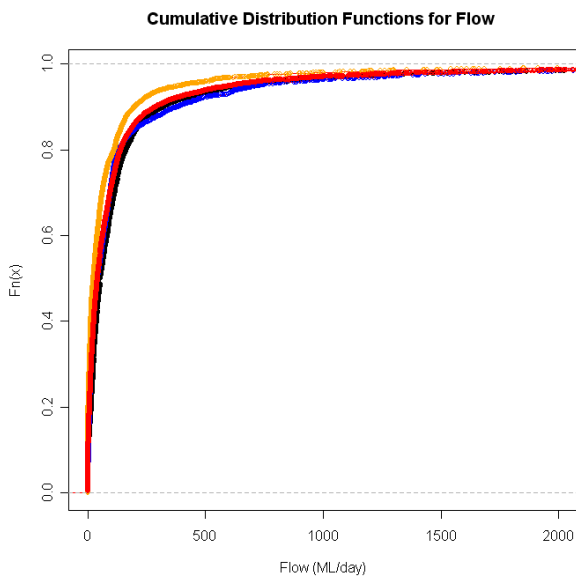
Assessment of the distribution of flow and EC records for station 210064 suggests higher flows in the 1970s & 1980s but similar flows in the 1990s to 2000s. EC levels in the 2000s were generally lower than in the 1990s and much lower than EC levels in the 1970s & 1980s. EC levels exceeded the 900 µS/cm more frequently over the period 1990 to 2013 at Greta than at Singleton. Median flow over the period 1970 to 2013 was 353 ML/day. Median EC over the period 1990 to 2013 was 731.9 µS/cm, much lower than the median EC level of 979 µS/cm recorded during the 1970s & 1980s.

Goulburn River stations

Station 210006 Goulburn River at Coggan



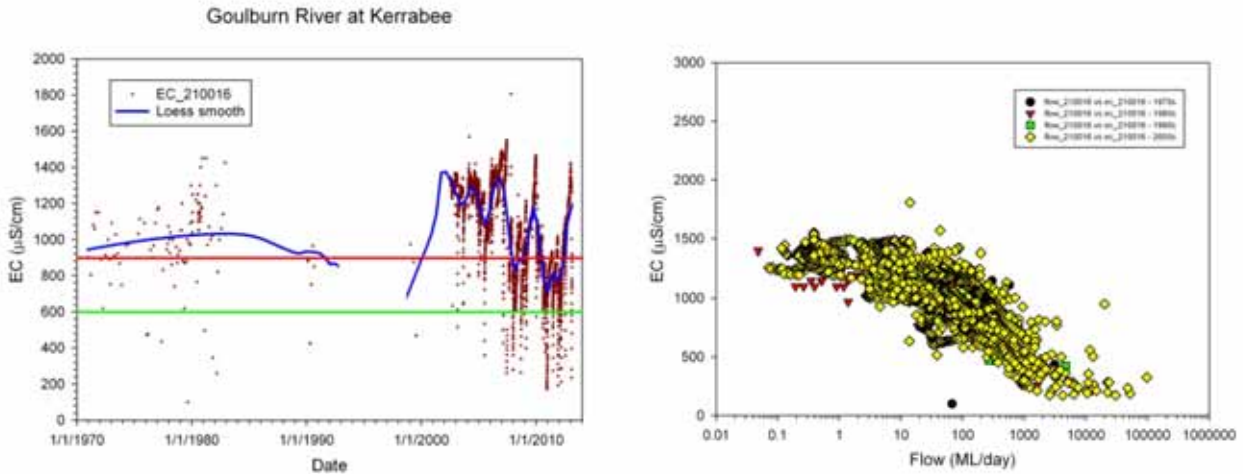
| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|---------------|--------------|---------------|-------|--------|
| Flow (ML/day) | 41.7 | 53.9 | 41.9 | 24.51 |
| EC (µS/cm) | 1007 | 1005 | 795 | 1010.4 |



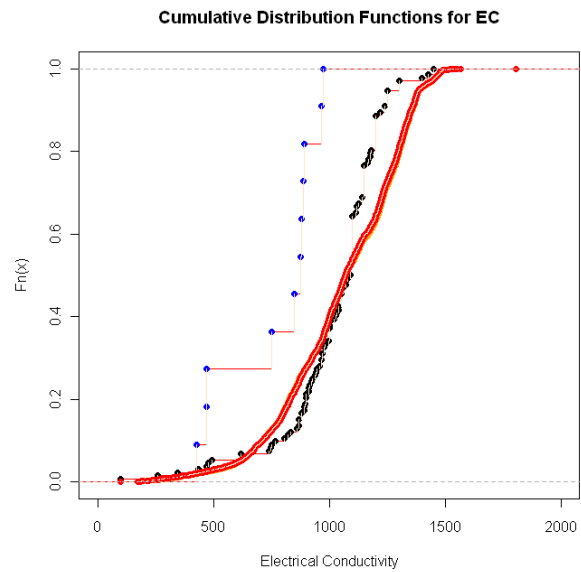
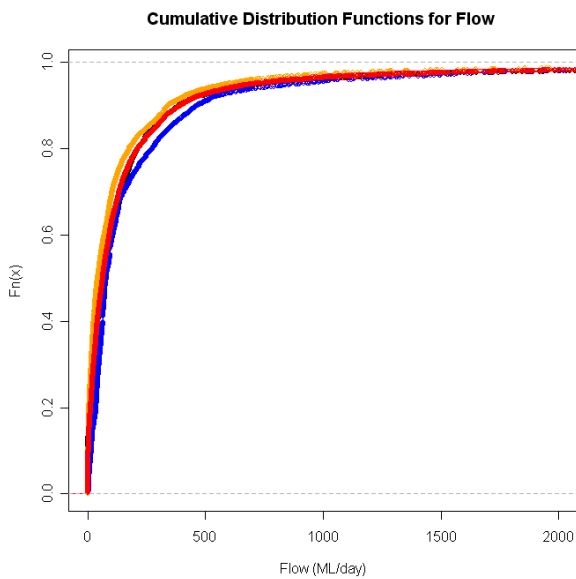
Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

Limited sampling of the Goulburn River at Coggan during the 1970s to 2000s makes comparisons between periods difficult. At this point there appears to be no trend in conductivity levels at this site but further analysis is warranted as more EC data are collected over time. Median EC level over the period of record was 1007 µS/cm.

Station 210016 Goulburn River at Kerrabee



| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|---------------|--------------|---------------|-------|--------|
| Flow (ML/day) | 63.7 | 68.94 | 78.8 | 42.42 |
| EC (µS/cm) | 1070.4 | 1090.5 | 876 | 1070.8 |

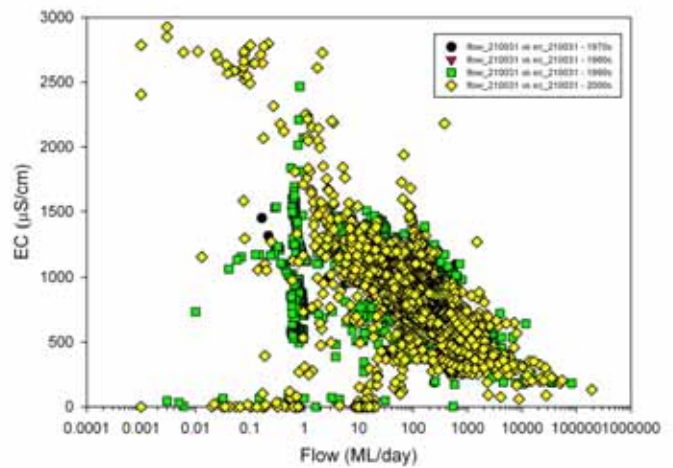
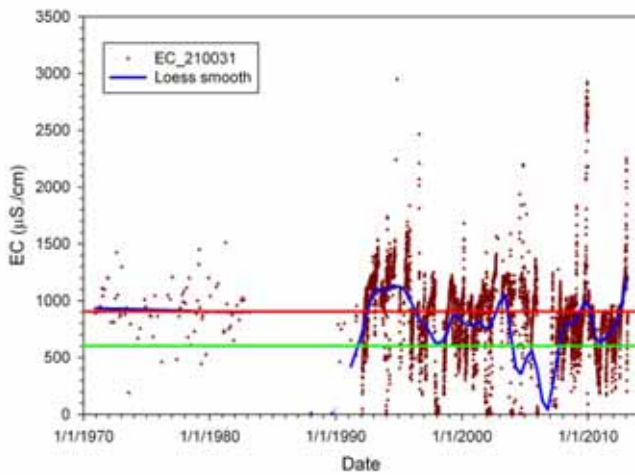


Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

Assessment of the distribution of flow and EC records for station 210016 suggests higher flows in the 1990s compared to other periods. Very few EC records were available for the 1990s, but the EC levels in the 2000s were similar to EC levels in the 1970s & 1980s, with some higher EC records overall in the 2000s. EC levels frequently exceeded 1000 µS/cm but there appears to be a declining trend since the mid 2000s. Cyclical patterns were also evident in the data and these require further assessment. Median flow over the period 1970 to 2013 was 63.7 ML/day. Median EC over the period 1970 to 2013 was 1070.4 µS/cm.

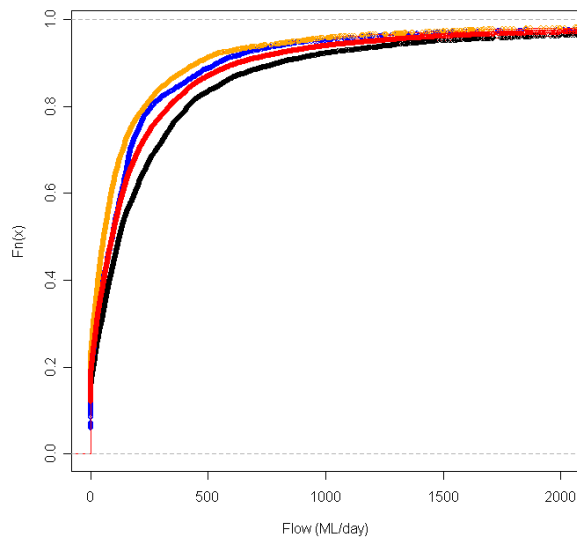
Station 210031 Goulburn River at Sandy Hollow

Goulburn River at Sandy Hollow

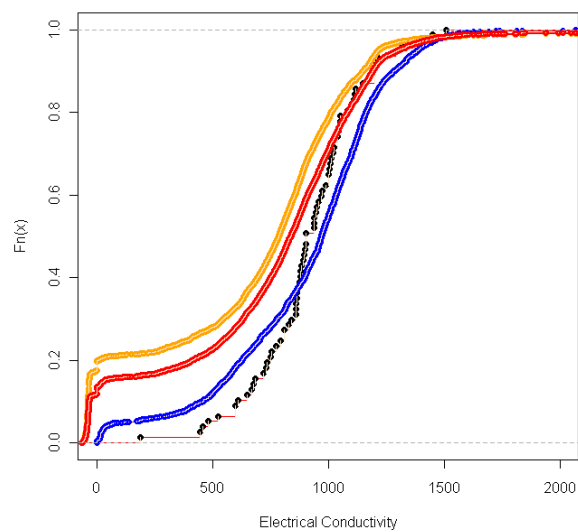


| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|-------------------------|--------------|---------------|-------|-------|
| Flow (ML/day) | 93.3 | 124 | 94 | 57.2 |
| EC ($\mu\text{S/cm}$) | 837.5 | 905 | 970.3 | 786.2 |

Cumulative Distribution Functions for Flow



Cumulative Distribution Functions for EC



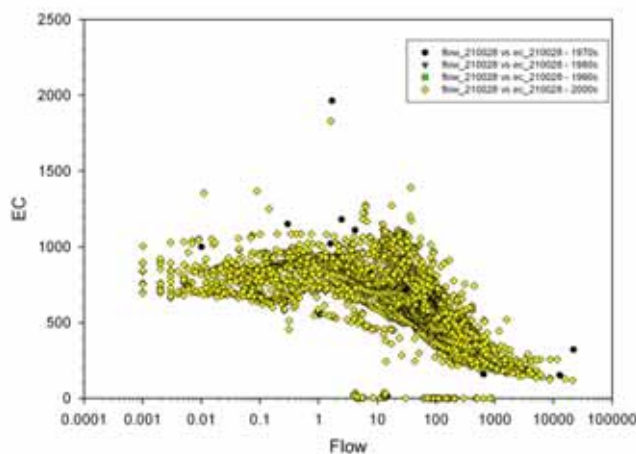
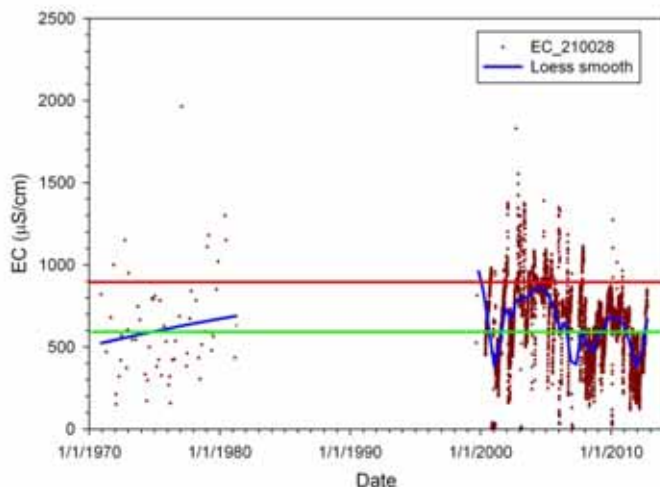
Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

Assessment of the distribution of flow and EC records for station 210031 suggests higher flows in the 1970s & 1980s compared to more recent periods. EC records for the 1970s & 1980s and 1990s were higher than EC records in the 2000s. EC levels frequently exceeded 1000 $\mu\text{S/cm}$ and again there appears to be a declining trend since the 1990s. Some relatively high EC levels (2500 to 3000 $\mu\text{S/cm}$) have been recorded in recent times. Cyclical patterns were also evident in the data for the Goulburn River at Sandy Hollow, but not as pronounced as at Kerrabee. These patterns require further assessment. Median flow over the period 1970 to 2013 was 93.3 ML/day. Median EC over the period 1970 to 2013 was 837.5 $\mu\text{S/cm}$.

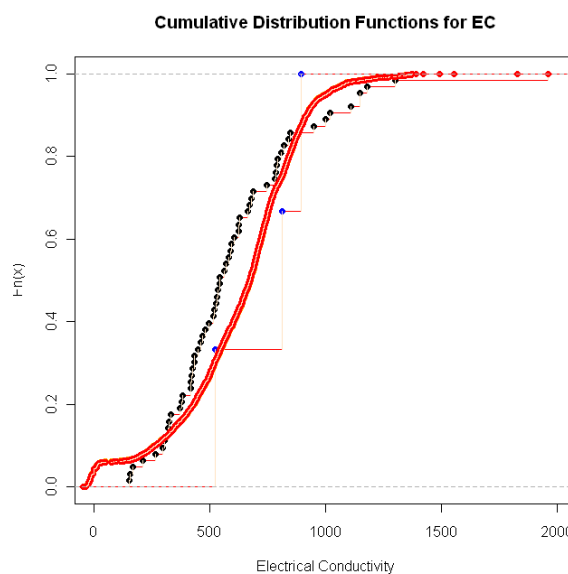
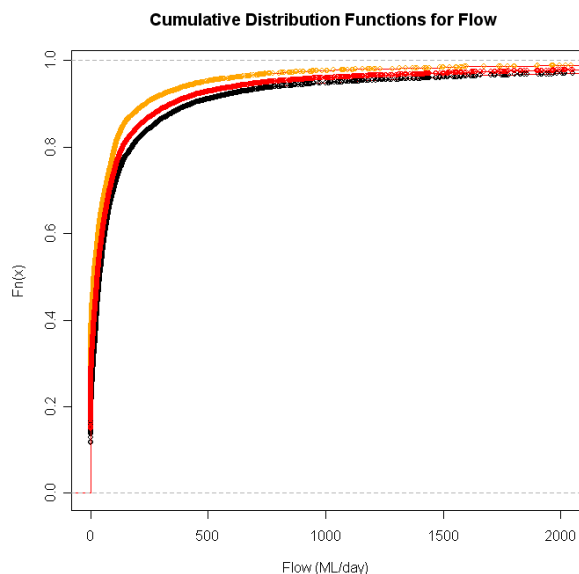
Wollombi Brook stations

Station 210028 Wollombi Brook at Bulga

Wollombi Brook at Bulga



| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|---------------|--------------|---------------|-------|-------|
| Flow (ML/day) | 28.98 | 38.52 | NA | 14.42 |
| EC (µS/cm) | 674 | 546 | 813 | 675.5 |

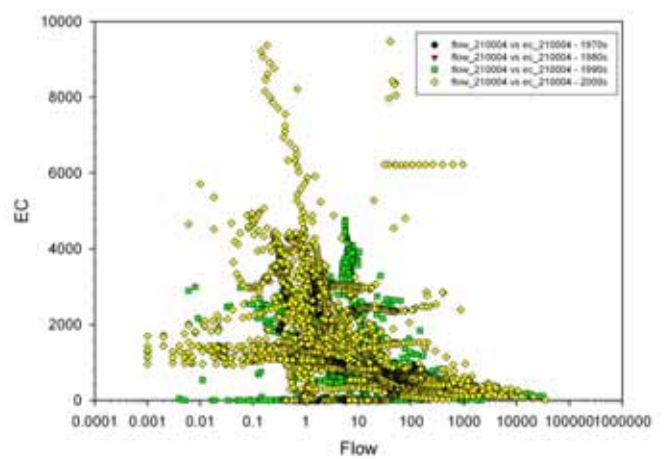
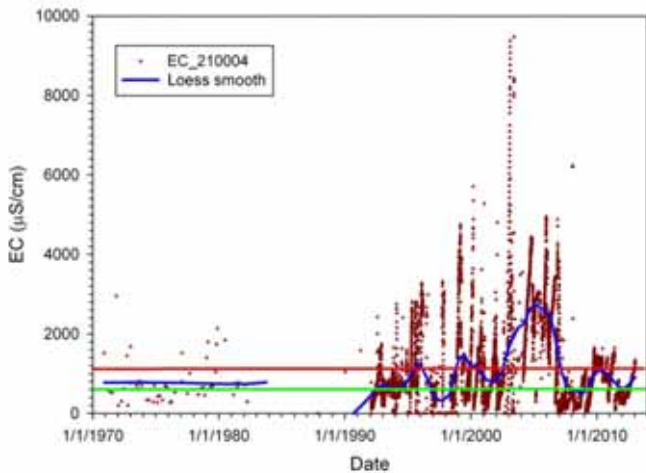


Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

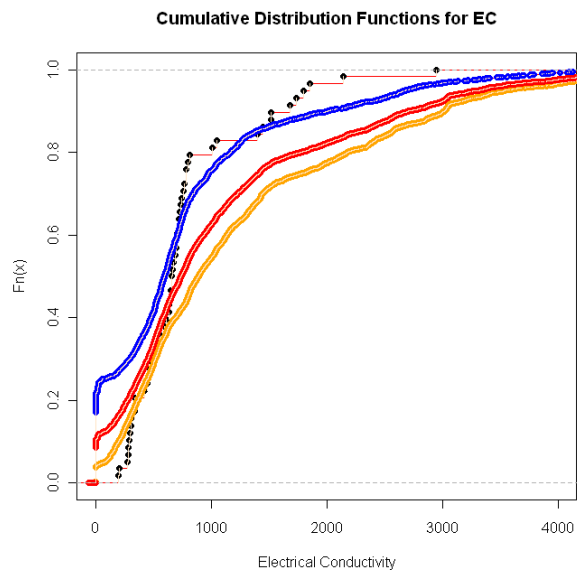
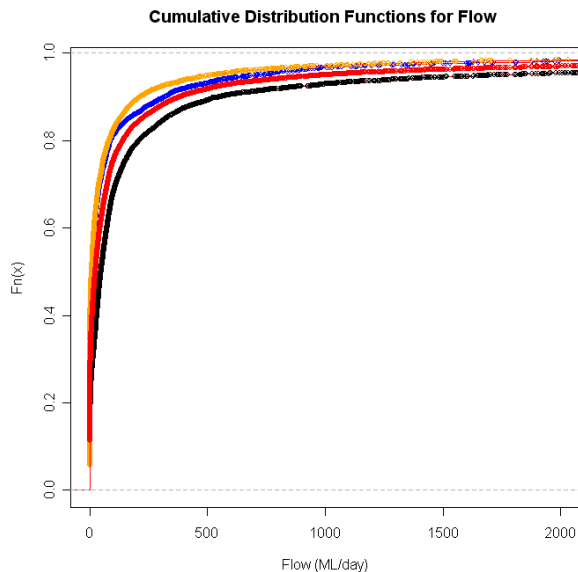
Assessment of the distribution of flow and EC records for station 210028 suggests higher flows in the 1970s & 1980s compared to the 2000s. Limited flow data was available for the 1990s. EC records for the 1970s & 1980s and 1990s were slightly lower than EC levels in the 2000s but this may be affected to some degree by sample size differences. EC levels exceeded 1000 µS/cm on some occasions and there appears to be a declining trend since the early 2000s. Median flow over the period 1970 to 2013 was 28.98 ML/day. Median EC over the period 1970 to 2013 was 674 µS/cm.

Station 210004 Wollombi Brook at Warkworth

Wollombi Brook at Warkworth



| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|---------------|--------------|---------------|-------|-------|
| Flow (ML/day) | 24.04 | 48.34 | 12.15 | 835 |
| EC (µS/cm) | 740.5 | 660 | 595.7 | 891.1 |



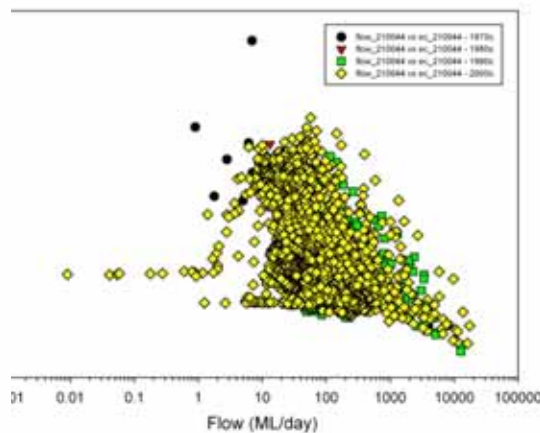
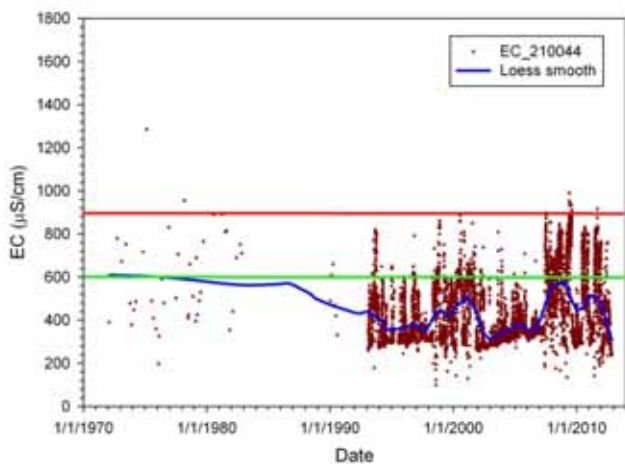
Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

Assessment of the distribution of flow and EC records for station 210004 suggests higher flows in the 1970s & 1980s compared to the 1990s and 2000s. EC records for the 1970s & 1980s and 1990s were obviously lower than EC levels in the 2000s. EC levels exceeded 1000 µS/cm for most of the 2000s with some very high EC levels (approaching 10,000 µS/cm) recorded. The EC–flow relationship demonstrates that EC concentrations were often not well-correlated with flow. This is clearly different to the patterns of EC and flow upstream at Bulga. Overall, the EC data implies impacts either from groundwater moving into Wollombi Brook and/or from mining. Further assessment is necessary to fully understand the underlying mechanisms yielding high EC levels in Wollombi Brook at Warkworth. Median flow over the period 1970 to 2013 was 24.04 ML/day. Median EC over the period 1970 to 2013 was 740.5 µS/cm. Median EC levels during the 2000s has been 891.1 µS/cm.

Glennies Creek stations

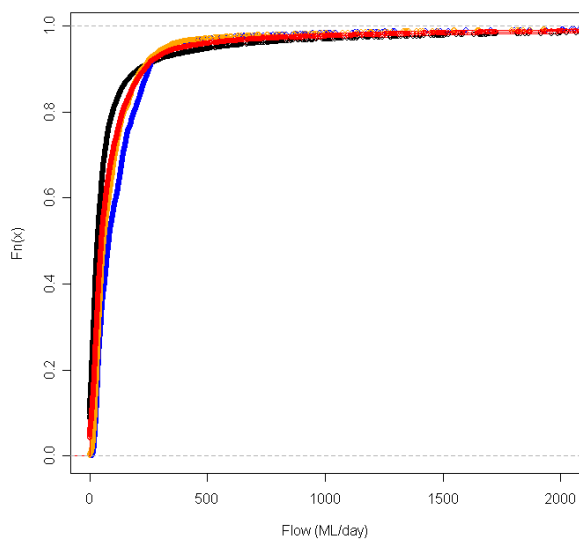
Station 210044 Glennies Creek at Middle Falbrook

Glennies Creek at Middle Fal Brook

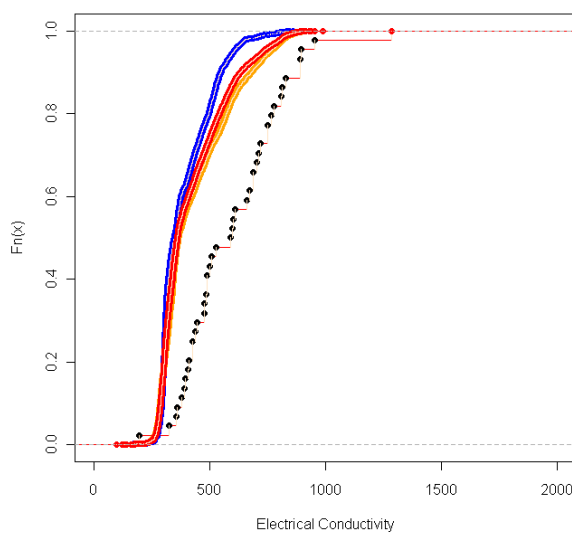


| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|---------------|--------------|---------------|-------|-------|
| Flow (ML/day) | 50.36 | 33.39 | 81.74 | 60.17 |
| EC (µS/cm) | 361.4 | 594.5 | 348.2 | 365.8 |

Cumulative Distribution Functions for Flow



Cumulative Distribution Functions for EC

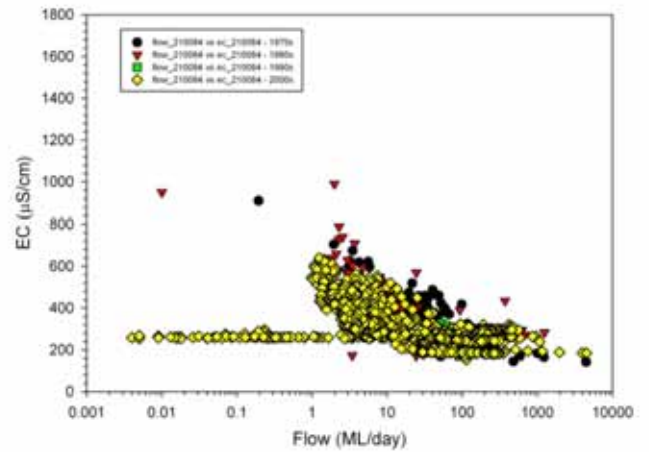
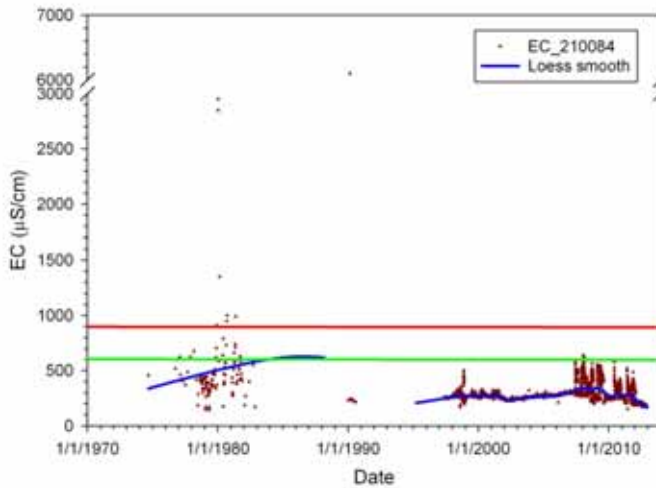


Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

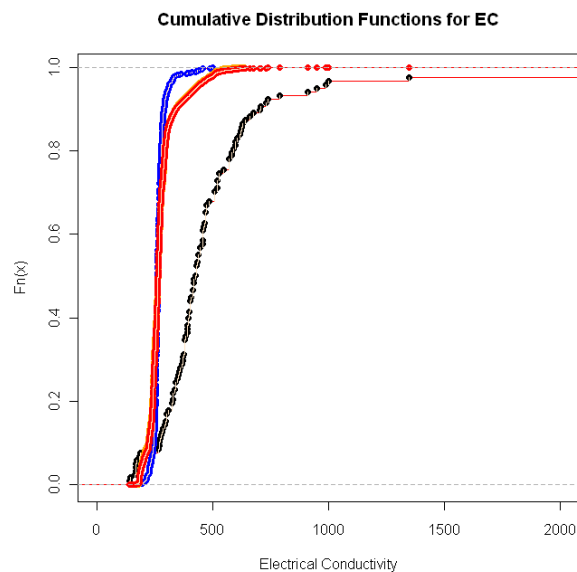
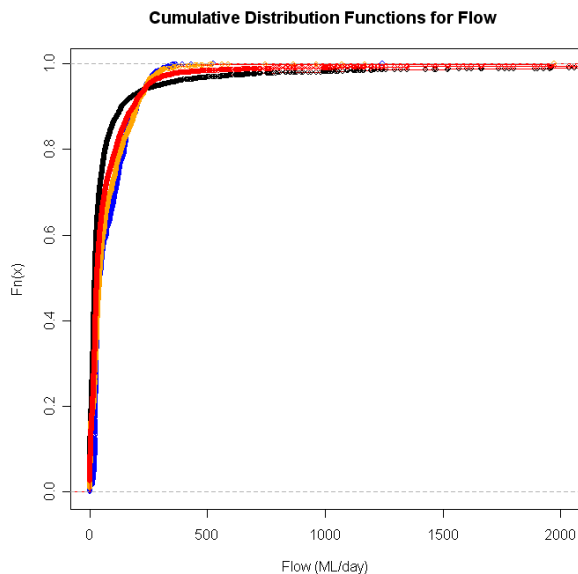
Assessment of the distribution of flow and EC records for station 210044 suggests higher flows in the 1990s and 2000s compared to the 1970s & 1980s. EC records for the 1970s & 1980s were limited (Glennies Creek Dam was constructed in 1983) but appear to have been higher than EC levels in either the 1990s or 2000s. Higher EC levels occurred in the 2000s compared to the 1990s, but EC levels rarely exceed 900 µS/cm. Median flow over the period 1970 to 2013 was 50.36 ML/day. Median EC over the period 1970 to 2013 was 361.4 µS/cm.

Station 210084 Glennies Creek at The Rocks No. 2

Glennies Creek at The Rocks No. 2



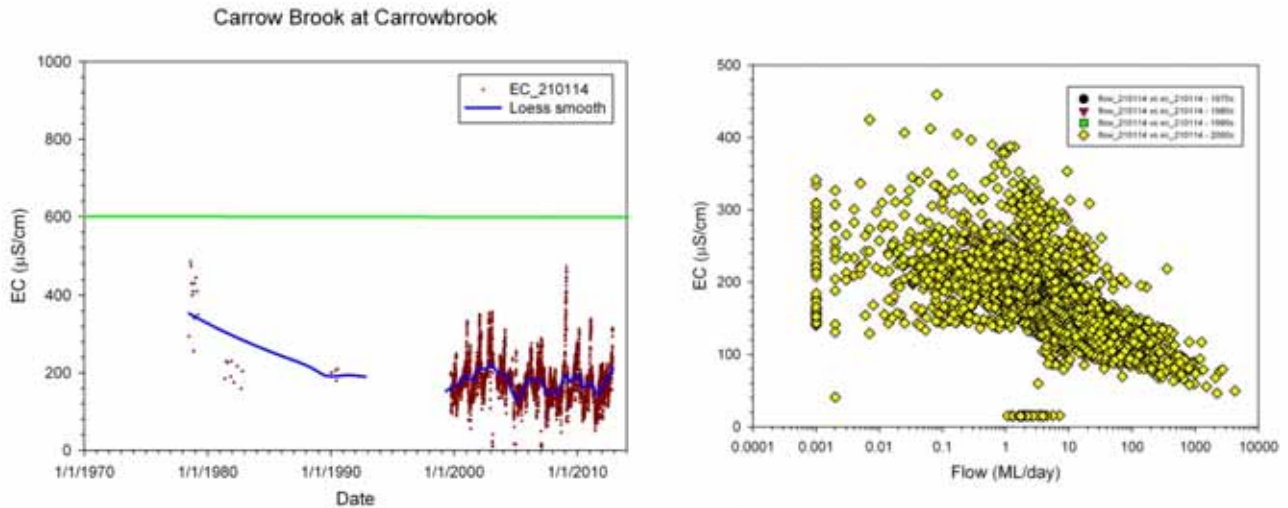
| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|-------------------------|--------------|---------------|-------|-------|
| Flow (ML/day) | 31.05 | 22.24 | 43.6 | 42.94 |
| EC ($\mu\text{S/cm}$) | 265 | 427.5 | 263.3 | 265 |



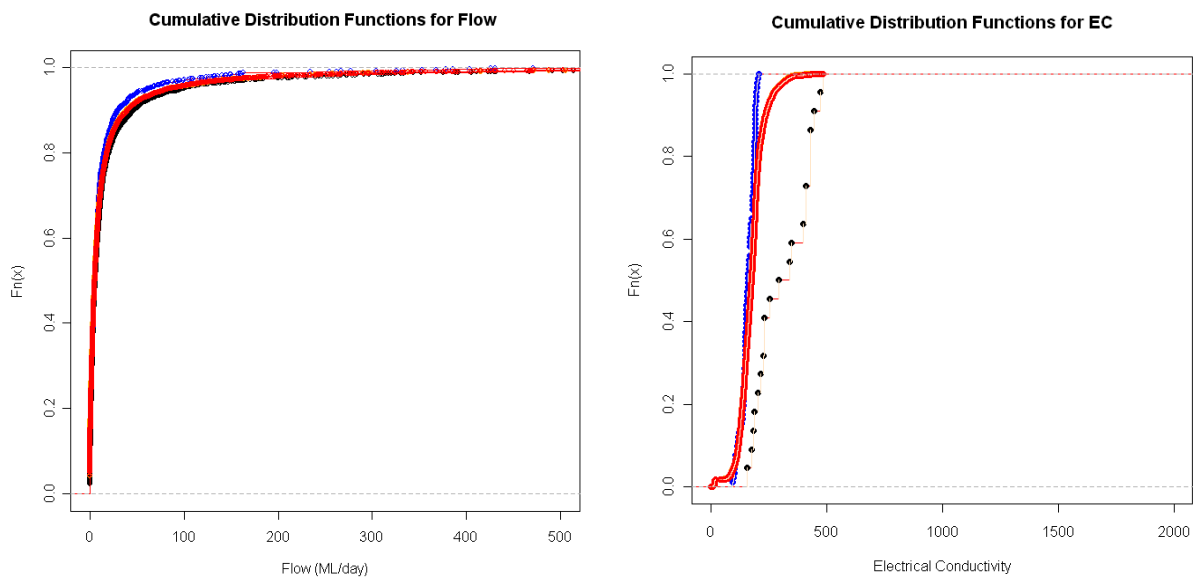
Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

Station 210084 is downstream of Glennies Creek Dam (Glennies Creek Dam was constructed in 1983). Assessment of the distribution of flow and EC records for station 210044 suggests higher flows in the 1990s and 2000s compared to the 1970s & 1980s. EC records for the 1970s & 1980s were limited but indicate higher EC levels (median = 427.5 $\mu\text{S/cm}$) than EC levels in the 1990s and 2000s (median = 263–265 $\mu\text{S/cm}$). EC levels now rarely exceed 600 $\mu\text{S/cm}$. Median flow over the period 1970 to 2013 was 31.05 ML/day. Median EC over the period 1970 to 2013 was 265 $\mu\text{S/cm}$.

Station 210114 Carrow Brook at Carrowbrook



| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|--------------------------------|--------------|---------------|-------|-------|
| Flow (ML/day) | 5.43 | 5.89 | 5.39 | 5.21 |
| EC ($\mu\text{S}/\text{cm}$) | 175.8 | 317 | 161 | 176 |



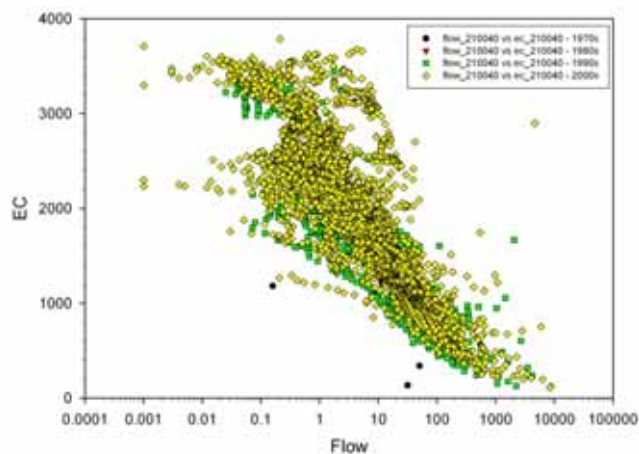
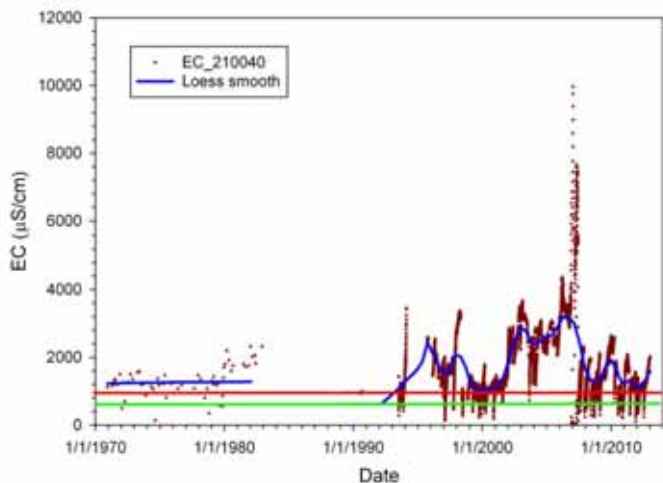
Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

Station 210114 is upstream of Glennies Creek Dam (Glennies Creek Dam was constructed in 1983). Assessment of the distribution of flow and EC records for station 210114 suggests flows were similar in all periods. Limited EC data was available for the 1970s & 1980s. EC records for the 1990s and 2000s were similar. EC levels are low and have not exceeded 600 $\mu\text{S}/\text{cm}$. Median flow over the period 1970 to 2013 was 5.43 ML/day. Median EC over the period 1970 to 2013 was 175.8 $\mu\text{S}/\text{cm}$.

Other stations

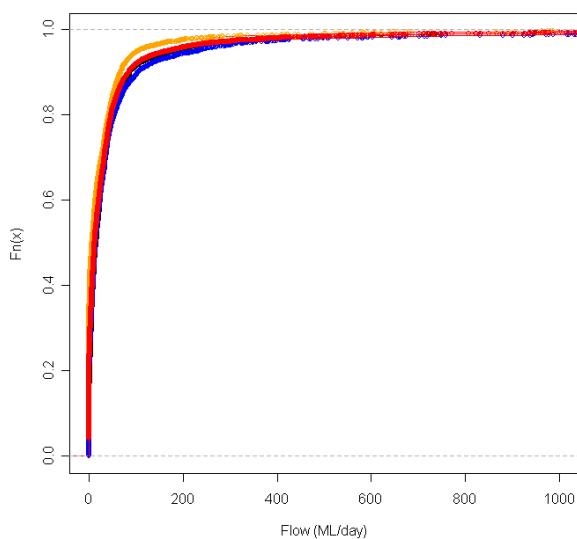
Station 210040 Wybong Creek at Wybong

Wybong Creek at Wybong

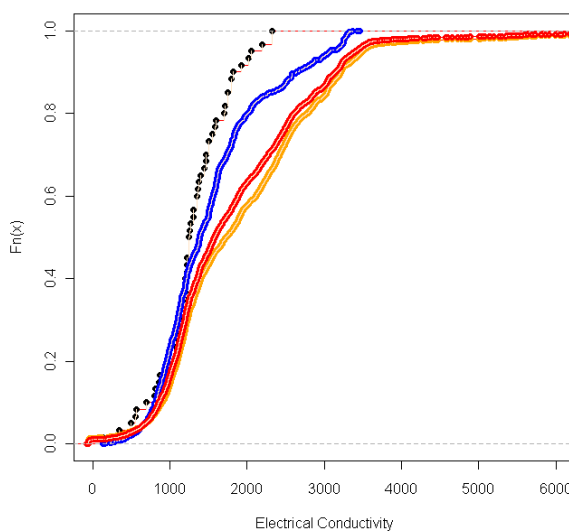


| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|---------------|--------------|---------------|--------|--------|
| Flow (ML/day) | 12.7 | 15.52 | 14.35 | 7.2 |
| EC (µS/cm) | 1578.8 | 1256 | 1387.2 | 1728.1 |

Cumulative Distribution Functions for Flow



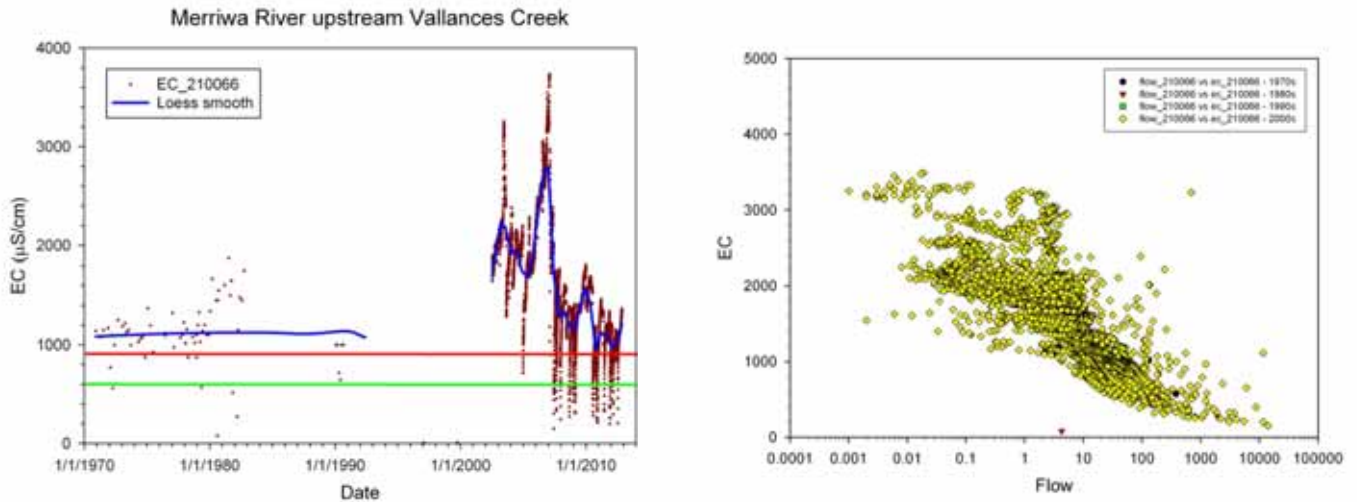
Cumulative Distribution Functions for EC



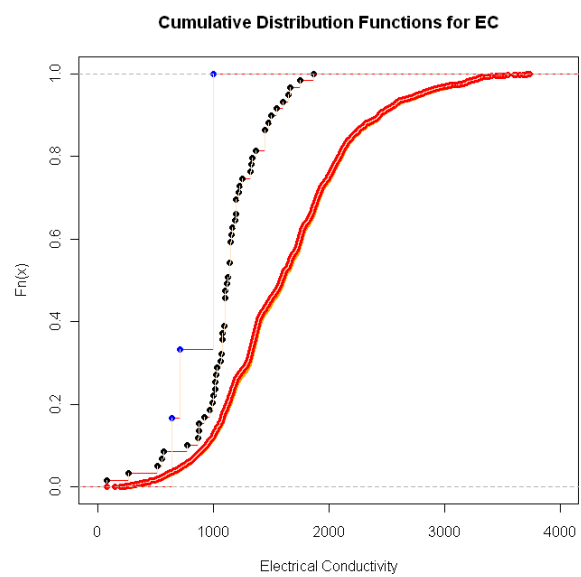
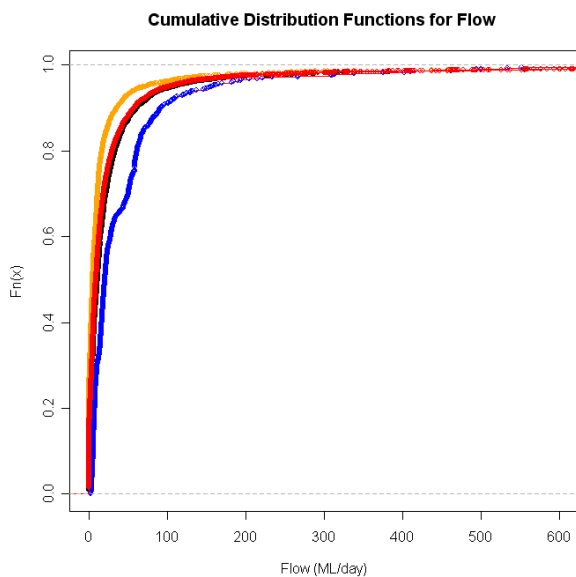
Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

Assessment of the distribution of flow and EC records for station 210040 suggests flows were similar in all periods. Limited EC data was available for the 1970s & 1980s but it appears that EC levels in the 2000s have been significantly higher (median = 1728.1 µS/cm) than in either the 1990s or 1970s & 1980s. There was a clear increasing trend in EC levels from the early 2000s to about 2007 which coincides with drought. Further assessment of EC levels is required for Wybong Creek. Median flow over the period 1970 to 2013 was 12.7 ML/day. Median EC over the period 1970 to 2013 was 1578.8 µS/cm.

Station 210066 Merriwa River at upstream Vallances Creek



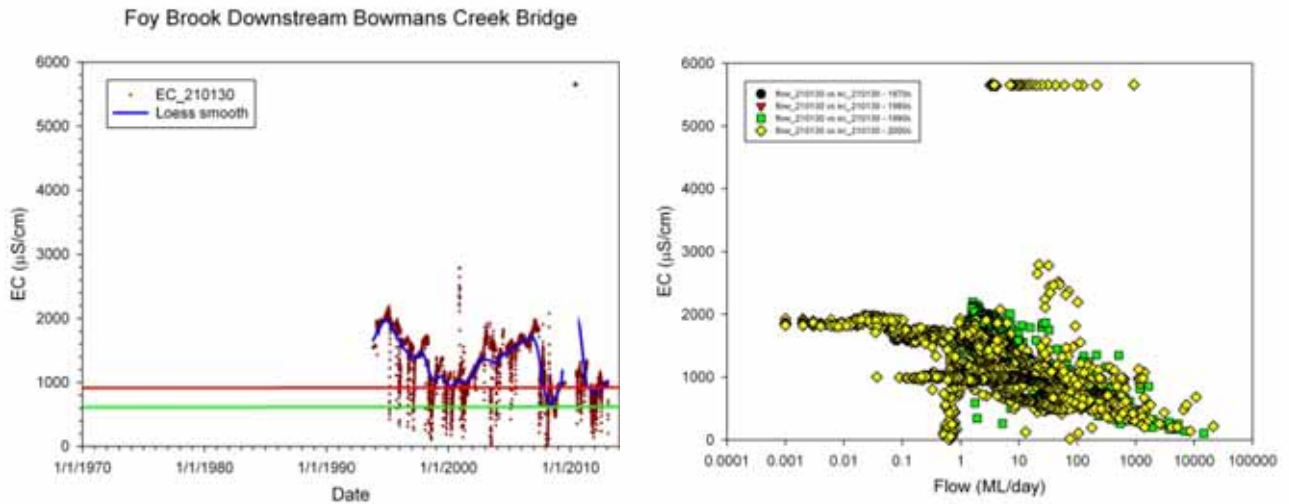
| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|--------------------------------|--------------|---------------|-------|--------|
| Flow (ML/day) | 9.23 | 11.06 | 20.7 | 5.07 |
| EC ($\mu\text{S}/\text{cm}$) | 1590 | 1130 | 1000 | 1598.2 |



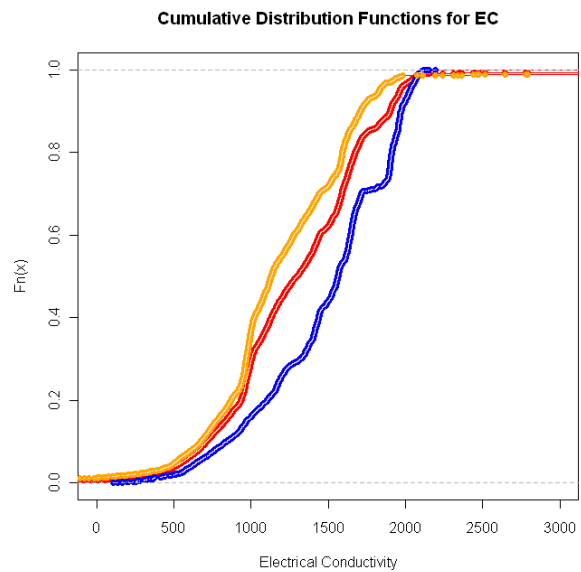
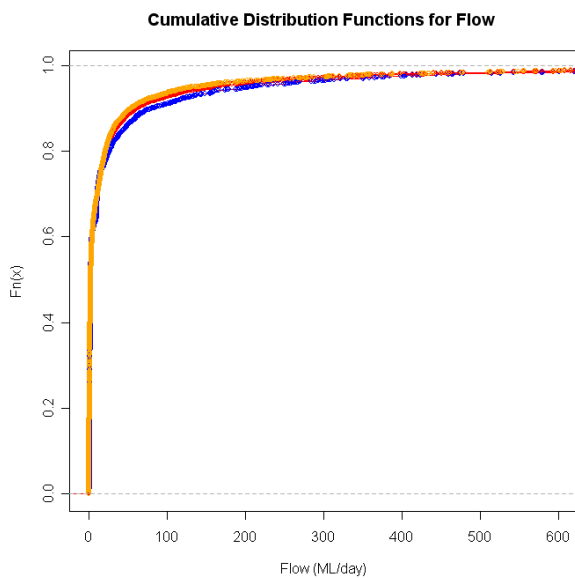
Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

Assessment of the distribution of flow and EC records for station 210066 suggests flows were much lower in the 2000s compared to either the 1970s & 1980s or the 1990s. Limited EC data was available for the 1970s & 1980s or 1990s, but it appears that EC levels in the 2000s have been significantly higher (median = 1598.2 $\mu\text{S}/\text{cm}$) than in earlier periods. There was a clear increasing trend in EC levels from the early 2000s to about 2007 which coincides with drought. Since that time however, EC levels have declined significantly. Further assessment of EC levels is required for the Merriwa River. Median flow over the period 1970 to 2013 was 9.23 ML/day. Median EC over the period 1970 to 2013 was 1590 $\mu\text{S}/\text{cm}$.

Station 210130 Foy Brook at downstream Bowmans Creek Bridge



| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|---------------|--------------|---------------|-------|--------|
| Flow (ML/day) | 2.8 | NA | 2.8 | 2.76 |
| EC (µS/cm) | 1297.3 | NA | 1563 | 1129.7 |

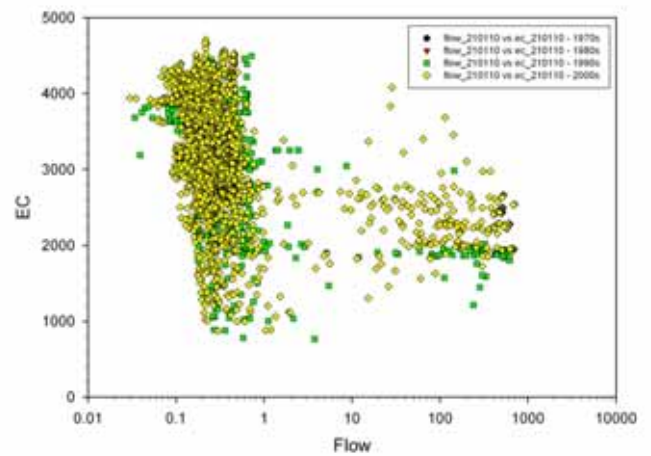
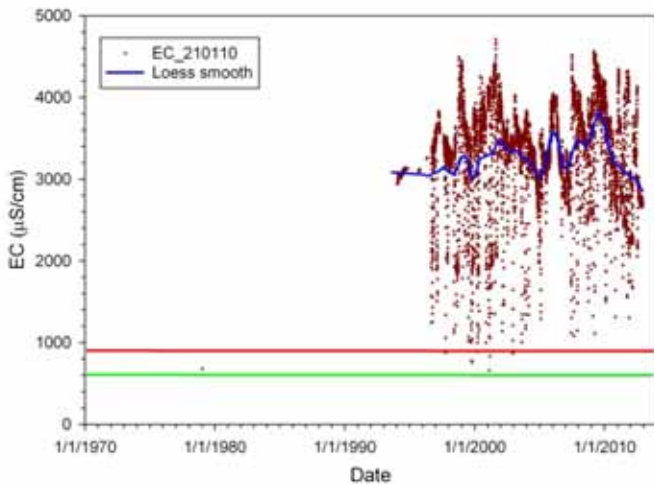


Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

Assessment of the distribution of flow and EC records for station 210130 suggests flows were similar in the 1990s and 2000s. No flow data were available for the 1970s & 1980s. Limited EC data was available for the 1970s & 1980s, but EC levels were higher in the 1990s compared to the 2000s. There was a clear increasing trend in EC levels from the early 2000s to about 2007 which coincides with drought. However, since that time EC levels have declined significantly, although there is a clear outlier (~6000 µS/cm) and a gap in the EC record. Further assessment of EC levels is required for Foy Brook. Median flow over the period 1970 to 2013 was 2.8 ML/day. Median EC over the period 1970 to 2013 was 1297.3 µS/cm.

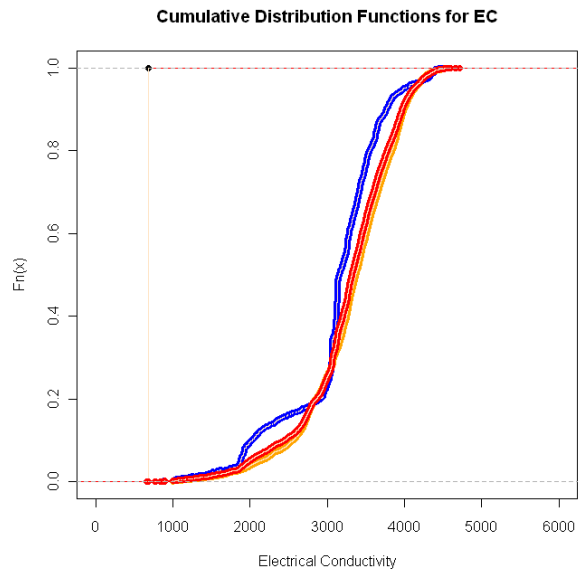
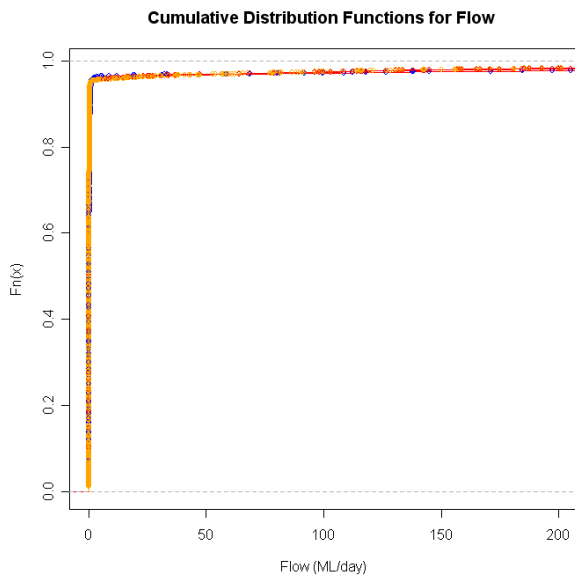
Station 210110 Bayswater Creek at Liddell

Bayswater Creek at Liddell



| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|---------------|--------------|---------------|--------|-------|
| Flow (ML/day) | 0.24 | NA | 0.26 | 0.23 |
| EC (µS/cm) | 3118.9 | NA* | 3157.5 | 3370 |

*One value for conductivity at 680 µS/cm.

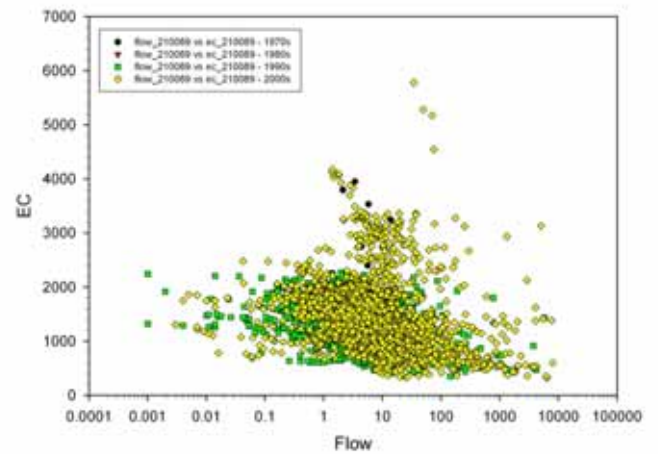
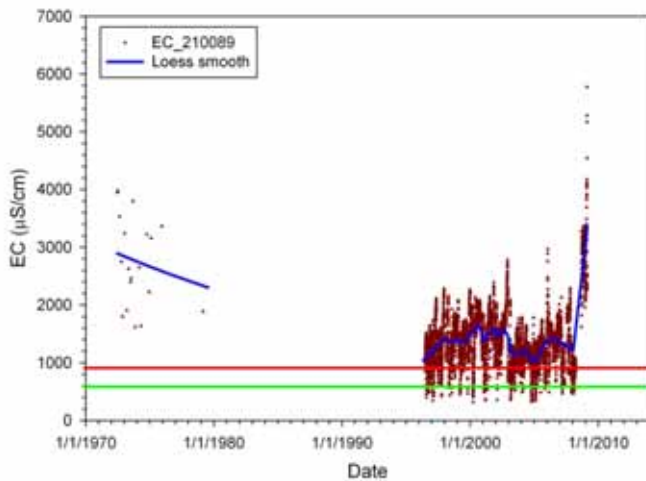


Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

Assessment of the distribution of flow and EC records for station 210110 suggests flows were similar in the 1990s and 2000s. No flow data were available for the 1970s & 1980s. Overall flows are low (median = 0.24 ML/day). No EC data were available for the 1970s & 1980s, but EC levels were higher in the 2000s compared to the 1990s. EC levels have remained relatively consistent over the past two decades (median = 3118.9 µS/cm), however maximum levels can be high (approaching 5000 µS/cm). While a flow concentration relationship exists for Bayswater Creek it also appears to be influenced by discharges at relatively higher flow rates. Further assessment of EC levels is required for Bayswater Creek.

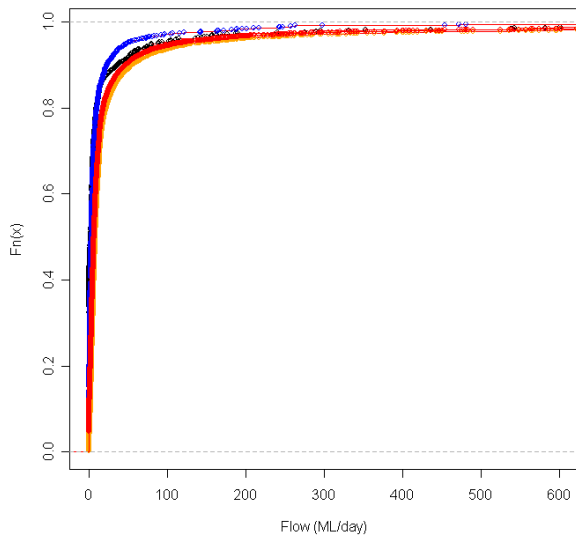
Station 210089 Black Creek at Rothbury

Black Creek at Rothbury

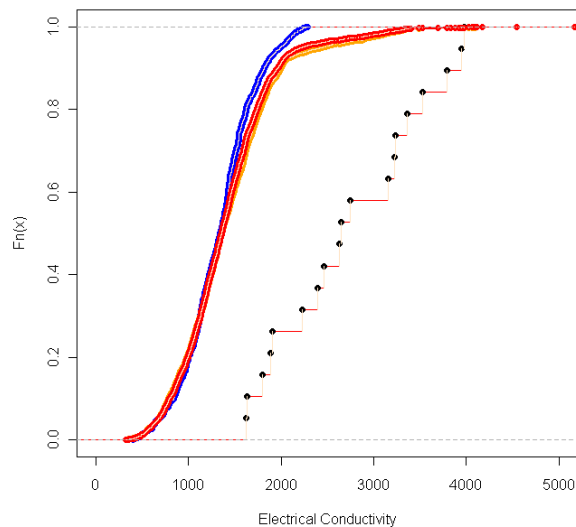


| Period | 1970 to 2013 | 1970s & 1980s | 1990s | 2000s |
|-------------------------|--------------|---------------|--------|--------|
| Flow (ML/day) | 6.6 | 2.751 | 3.34 | 8.364 |
| EC ($\mu\text{S/cm}$) | 1360.5 | 2652 | 1346.1 | 1362.5 |

Cumulative Distribution Functions for Flow



Cumulative Distribution Functions for EC



Red Line = 1970–2013
 Black Line = 1970s & 1980s
 Blue Line = 1990s
 Orange Line = 2000s

Assessment of the distribution of flow and EC records for station 210089 suggests higher flows in the 2000s compared to the 1970s & 1980s and 1990s. EC records for the 1970s & 1980s were limited but appear to have been higher than EC levels in either the 1990s or 2000s. Higher EC levels occurred in the 2000s compared to the 1990s and EC levels often exceed 900 $\mu\text{S/cm}$. Median flow over the period 1970 to 2013 was 6.6 ML/day. Median EC over the period 1970 to 2013 was 1360.5 $\mu\text{S/cm}$.