

**Waterwatch Victoria Data Confidence Framework**  
**Indicator: pH**

<b>QA/QC Fields</b>	<b>Field specifics</b>	<b>Standard One (1)</b>	<b>Standard Two (2)</b>	<b>Standard Three (3)</b>	<b>Standard Four (4)</b>
<b>Recommended Equipment</b>	<b>Type</b>	pH strips	pH strips and/or pH meters	pH meter (internal thermometer recommended)	pH meter (with internal thermometer)
	<b>Range</b>	5 – 9 pH units	5 - 10 pH units	1– 14 pH units	1– 14 pH units
	<b>Resolution</b>	0.5 pH units	0.5 pH units – 0.1 pH units	0.1 pH units	0.1 pH units
	<b>Instrument accuracy</b>	± 0.5 pH units	Strips: ± 0.5 pH units pH meter: ± 0.2 pH units	± 0.1 pH units	± 0.1 pH units
<b>Standard Methods</b>	<b>Calibration methods</b>	No calibration required.	pH strips: no calibration required. Meter: 1 point calibration (pH 7)	2 point calibration, pH 7 and pH 4 or pH 9.18/10 (span appropriate for infield pH conditions)	2 or 3 point calibration, pH 7 and pH 4 and/or pH 9.18/10 (span appropriate for infield pH conditions). Calibration recommended before all sampling.
	<b>Sampling and measurement methods</b>	Refer to Waterwatch Victoria Methods manual: pg 11	Refer to Waterwatch Victoria Methods manual: pg 10	Refer to Waterwatch Victoria Methods manual: pg 10, or other method specific to instrumentation (documented method to be reviewed by Waterwatch Science Coordinator)	Refer to Waterwatch Victoria Methods manual: pg 10, or other method specific to instrumentation (documented method to be reviewed by Waterwatch Science Coordinator)
	<b>Quality Control mechanisms</b>	Not applicable	Waterwatch Victoria Data Confidence Manual: pg 12	Waterwatch Victoria Data Confidence Manual: pg 12 and 29	Waterwatch Victoria Data Confidence Manual: pg 12 and 29 QA/QC checks – accuracy and precision checks (in field and lab)
	<b>Record Keeping</b>	Instrument specification log (purchase date/type/model/contact details for distributor)	Instrument specification log (purchase date/type/model/contact details for distributor) Calibration log (meters only) Equipment maintenance/servicing log Logs for coordinators noting training type and date, skills learned (noting competency) and the trainer's name (see page 24 of WW Vic Data Confidence Manual).	Instrument specification log (purchase date/type/model/contact details for distributor) Calibration log Equipment maintenance/servicing log Logs for coordinators and Waterwatch monitors, noting training type and date, skills learned (noting competency) and the trainer's name (see page 24 of WW Vic Data Confidence Manual).	Instrument specification log (purchase date/type/model/contact details for distributor) Calibration log Equipment maintenance/servicing log Logs for coordinators and Waterwatch monitors, noting training type and date, skills learned (noting competency) and the trainer's name (see page 24 of WW Vic Data Confidence Manual).
<b>Competencies</b>	<b>Waterwatch monitor competencies</b>	Sample collection (sample collection quality control page 10 WW Victoria Data Confidence Manual); Recording data; field and chemical safety (where applicable);	Sample collection (sample collection quality control page 10 WW Victoria Data Confidence Manual); Recording data; field and chemical safety (where applicable).	Sample collection (sample collection quality control page 10 WW Victoria Data Confidence Manual); Recording data; field and chemical safety (where applicable); Logging of calibration records (post-calibration checks) Participation in regional phys-chem workshops	Sample collection (sample collection quality control page 10 WW Victoria Data Confidence Manual) Thorough use and application of state-wide standard procedures or other specified standards

	<b>Waterwatch coordinator competencies</b>	Thorough use and application of statewide standard procedures or regionally specific procedures. Attendance/participation in state-wide QA/QC program Recommended participation in phys-chem training/refresher courses.	Thorough use and application of statewide standard procedures or regionally specific procedures. Attendance/participation in state-wide QA/QC program Recommended participation in phys-chem training/refresher courses.	Thorough use and application of statewide standard procedures or regionally specific procedures. Attendance/participation in state-wide QA/QC program Recommended participation in phys-chem training/refresher courses.	Thorough use and application of statewide standard procedures or regionally specific procedures. Attendance/participation in state-wide QA/QC program Recommended participation in phys-chem training/refresher courses.
<b>Regional Quality Control Review</b>		Not applicable	Not applicable	Regional mystery samples for volunteers to measure (at least 2 times per year) for core indicators (encouraged)	Shadow-testing in field against other water quality monitoring parties (eg. Contractors, departmental staff) (recommended). Regional mystery samples for volunteers to measure (at least 2 times per year) for core indicators
<b>State-wide Quality Control review</b>		State-wide mystery samples (June) (participation optional)	State-wide mystery samples (June) groups encouraged to participate and strive to meet acceptable limits ( $\pm 0.3$ pH units for meters, $\pm 0.5$ pH units for pH strips)	State-wide mystery samples (June): group strongly encouraged to meet acceptable limits ( $\pm 0.3$ pH units) Yearly review of regional implementation of Data Confidence Plans	State-wide mystery samples (June): groups expected to fall consistently within acceptable limits ( $\pm 0.3$ pH units) Yearly review of regional implementation of Data Confidence Plans
<b>Monitoring frequency</b>	<b>Physical-chemical parameters</b>	Random	Strategic once a year (min) – quarterly (preferred)	Quarterly (min)	Monthly (min)
<b>Database</b>	<b>Data storage facility</b>	Spreadsheet and/or local catchment database	Regional Waterwatch database	Regional Waterwatch database, DSE Data Warehouse	Regional Waterwatch Database, DSE Data Warehouse
	<b>Data validation</b>	Low level supervision/training	Data entered onto database by coordinator or trained Waterwatchers only. Data entered into database is checked against datasheets for correct transfer, or checked with monitors if considered an anomaly. Datasheets are clearly marked once data is entered onto the database.	Data entered onto database by coordinator or trained Waterwatchers only. Data entered into database is checked against datasheets for correct transfer, or checked with monitors if considered an anomaly. Datasheets are clearly marked once data is entered onto the database.	Data entered onto database by coordinator or trained Waterwatchers only. Data entered into database is checked against datasheets for correct transfer, or checked with monitors if considered an anomaly. Datasheets are clearly marked once data is entered onto the database.

**Waterwatch Victoria Data Confidence Framework  
Indicator: Electrical Conductivity**

QA/QC Fields	Field specifics	Standard One (1)	Standard Two (2)	Standard Three (3)	Standard Four (4)
<b>Recommended Equipment</b>	<b>Equipment type</b>	EC Meter (See Waterwatch Victoria Equipment Manual pg 9)	EC Meter (measuring specific conductance at 25°C) (See Waterwatch Victoria Equipment Manual pg 9)	EC Meter (measuring specific conductance at 25°C) (See Waterwatch Victoria Equipment Manual pg 9), or EC probe on a multi-parameter instrument.	EC Meter (measuring specific conductance at 25°C) (See Waterwatch Victoria Equipment Manual pg 9), or EC probe on a multi-parameter instrument. Measurement range must cover infield conditions.
	<b>Range</b>	0 to 20 000 uS/cm	0 to 20 000 uS/cm	EC: 0 to 20 000 uS/cm or higher range if monitoring estuarine or brackish waters Temp: 0.0°C to 40°C	EC: 0.00 to 20 000 uS/cm, or higher range if monitoring estuarine reaches or brackish waters. Temp: 0.0°C to 40°C
	<b>Resolution</b>	10 uS/cm	10 uS/cm	10 uS/cm for range 0 – 1999 uS/cm; 0.10 mS/cm for range 0 – 19.9 mS/cm	10 uS/cm for range 0 – 1999 uS/cm; 0.10 mS/cm for range 0 – 19.9 mS/cm
	<b>Instrument accuracy</b>			EC: ± 2% full range Temp: ± 0.5°C	EC: ± 2% full range (min) Temp: ± 0.5°C
<b>Standard Methods</b>	<b>Calibration</b>	No calibration required.	Meter: 1 point calibration (1413 uS/cm) or other value specified by equipment.	2 point calibration, 0 uS/cm and 1413 uS/cm, or other more appropriate span value (span must suit meter specifications and capture infield EC conditions) If instrument is not capable of 2 point span, a post-calibration check against a different EC solution (ie. not calibration value) is recommended.	2 point calibration, 0 uS/cm and 1413 uS/cm, or other more appropriate span value (12880 uS/cm) (span must suit meter specifications and capture infield EC conditions) Calibration recommended before all sampling.
	<b>Sampling and measurement methods</b>	Waterwatch Victoria Methods manual: pg 13	Waterwatch Victoria Methods manual: pg 13	Waterwatch Victoria Methods manual: pg 13, or other method specific to instrumentation (documented method to be reviewed by Waterwatch Science Coordinator)	Waterwatch Victoria Methods manual: pg 13, or other method specific to instrumentation (documented method to be reviewed by Waterwatch Science Coordinator)
	<b>Quality Control mechanisms</b>	Not applicable	Waterwatch Victoria Data Confidence Manual: pg 13	Waterwatch Victoria Data Confidence Manual: pg 13 and 30	Waterwatch Victoria Data Confidence Manual: pg 13 and 30 QA/QC checks – accuracy and precision checks (in field and lab)
	<b>Record Keeping</b>	Not applicable	Instrument specification log (purchase date/type/model/contact details for distributor) Calibration log Equipment maintenance/servicing log Logs for coordinators noting training type and date, skills learned (noting competency) and the trainer's name (see page 24 of WW Vic Data Confidence Manual).	Instrument specification log (purchase date/type/model/contact details for distributor) Calibration log Equipment maintenance/servicing log (including battery replacement) Logs for coordinators and Waterwatch monitors, noting training type and date, skills learned (noting competency) and the trainer's name (see page 24 of WW Vic Data Confidence Manual).	Instrument specification log (purchase date/type/model/contact details for distributor) Calibration log Equipment maintenance/servicing log (including battery replacement) Logs for coordinators and Waterwatch monitors, noting training type and date, skills learned (noting competency) and the trainer's name (see page 24 of WW Vic Data Confidence Manual).

<b>Competencies</b>	<b>Waterwatch monitor competencies</b>	Sample collection (sample collection quality control page 10 WW Victoria Data Confidence Manual); Recording data; field and chemical safety (where applicable);	Sample collection (sample collection quality control page 10 WW Victoria Data Confidence Manual); Recording data; field and chemical safety (where applicable);	Sample collection (sample collection quality control page 10 WW Victoria Data Confidence Manual); Recording data; field and chemical safety (where applicable); Logging of calibration records (post-calibration checks) Participation in regional phys-chem workshops Active participation in regional QA/QC	Sample collection (sample collection quality control page 10 WW Victoria Data Confidence Manual) Thorough use and application of state-wide standard procedures or other specified standards
	<b>Waterwatch coordinator competencies</b>	Thorough use and application of statewide standard procedures or regionally specific procedures. Attendance/participation in state-wide QA/QC program Recommended participation in phys-chem training/refresher courses.	Thorough use and application of statewide standard procedures or regionally specific procedures. Attendance/participation in state-wide QA/QC program Recommended participation in phys-chem training/refresher courses.	Thorough use and application of statewide standard procedures or regionally specific procedures. Attendance/participation in state-wide QA/QC program Recommended participation in phys-chem training/refresher courses.	Thorough use and application of statewide standard procedures or regionally specific procedures. Attendance/participation in state-wide QA/QC program Recommended participation in phys-chem training/refresher courses.
<b>Regional Quality Control Review</b>		Not applicable	Not applicable	Regional mystery samples for volunteers to measure (at least 2 times per year) for core indicators (encouraged)	Shadow testing in field against other water quality monitoring parties (eg. Contractors, departmental staff) (recommended). Regional mystery samples for volunteers to measure (at least 2 times per year) for core indicators
<b>State-wide Quality Control review</b>		State-wide mystery samples (June) (participation optional)	State-wide mystery samples (June) groups encouraged to participate and strive to meet acceptable limits ( $\pm 10\%$ EC uS/cm)	State-wide mystery samples (June): groups encouraged to fall within acceptable limits ( $\pm 10\%$ EC uS/cm) Yearly review of regional implementation of Data Confidence Plans	State-wide mystery samples (June): groups expected to fall consistently within acceptable limits ( $\pm 10\%$ EC uS/cm) Yearly review of regional implementation of Data Confidence Plans
<b>Monitoring frequency</b>	<b>Physical-chemical parameters</b>	Random	Strategic once a year (min) – quarterly (preferred)	Quarterly (min)	Monthly (min)
<b>Database</b>	<b>Data storage facility</b>	Spreadsheet and/or local catchment database	Regional Waterwatch database	Regional Waterwatch database, DSE Data Warehouse	Regional Waterwatch Database, DSE Data Warehouse
	<b>Data validation</b>	Low level supervision/training	Data entered onto database by coordinator or trained Waterwatchers only. Data entered into database is checked against datasheets for correct transfer, or checked with monitors if considered an anomaly. Datasheets are clearly marked once data is entered onto the database.	Data entered onto database by coordinator or trained Waterwatchers only. Data entered into database is checked against datasheets for correct transfer, or checked with monitors if considered an anomaly. Datasheets are clearly marked once data is entered onto the database.	Data entered onto database by coordinator or trained Waterwatchers only. Data entered into database is checked against datasheets for correct transfer, or checked with monitors if considered an anomaly. Datasheets are clearly marked once data is entered onto the database.



Waterwatch Victoria Data Confidence Framework					
Indicator: Dissolved Oxygen					
QA/QC Fields	Field specifics	Standard One (1)	Standard Two (2)	Standard Three (3)	Standard Four (4)
<b>Recommended Equipment</b>	<b>Equipment type</b>	Broad scale DO colour comparators Presence/absence colour comparators	DO Colour comparators	DO colour comparators/DO modified Winkler titration/DO meter	DO meter (temperature, salinity and altitude correction) Winkler Titration (APHA 1992 methodology)
	<b>Resolution</b>	2 mg/L (min)	2 mg/L (min)	0.2 mg/L	0.1 mg/L
	<b>Range</b>	1-10 mg/L	1 – 12 mg/L	0 – 19.9 mg/L	0 – 19.9mg/L
	<b>Instrument accuracy</b>	± 1 mg/L	± 1 mg/L	± 0.5mg/L	Equal to or less than ± 0.2mg/L
<b>Standard methods</b>	<b>Calibration methods</b>	See instrument instructions	See instrument instructions.	See instrument instructions.	As per instrument instructions. Most DO meters are calibrated against a zero solution (sodium sulphide solution, 0 mg/L DO) and spanned against either a DO-saturated solution, air and/or a known titration value (Winkler titration method, not modified method).
	<b>Sampling and measurement methods</b>	Waterwatch Victoria Methods manual: pg 5-8	Waterwatch Victoria Methods manual: pg 5-8	Waterwatch Victoria Methods manual: pg 5-8, or other method specific to instrumentation (documented method to be reviewed by Waterwatch Science Coordinator) Temperature must be recorded with DO measurements  Groups encouraged to take 2 measurements at each site, one close to midday and one just after dawn to identify diurnal fluxes in DO.	Waterwatch Victoria Methods manual: pg 5-8, or other method specific to instrumentation (documented method to be reviewed by Waterwatch Science Coordinator)  Temperature must be recorded with DO measurements  Groups encouraged to take 2 measurements at each site, one close to midday and one just after dawn to identify diurnal fluxes in DO. Alternately, look at the potential value of adding in-stream data loggers for this parameter.
	<b>Quality Control mechanisms</b>	Not applicable	Waterwatch Victoria Data Confidence Manual: pg 15	Waterwatch Victoria Data Confidence Manual: pg 15 and 30	Waterwatch Victoria Data Confidence Manual: pg 15 and 30 QA/QC checks – accuracy and precision checks (in field and lab)
	<b>Record Keeping</b>	Instrument specification log (purchase date/type/model/contact details for distributor)	Instrument specification log (purchase date/type/model/contact details for distributor) Equipment maintenance/servicing log Logs for coordinators noting training type and date, skills learned (noting competency) and the trainer's name (see page 24 of WW Vic Data Confidence Manual).	Instrument specification log (purchase date/type/model/contact details for distributor) Calibration log Equipment maintenance/servicing log Logs for coordinators and Waterwatch monitors, noting training type and date, skills learned (noting competency) and the trainer's name (see page 24 of WW Vic Data Confidence Manual).	Instrument specification log (purchase date/type/model/contact details for distributor) Calibration log Equipment maintenance/servicing log (including battery replacement and/or replacement of membrane and electrolyte) Logs for coordinators and Waterwatch monitors, noting training type and date, skills learned (noting competency) and the trainer's name (see page 24 of WW Vic Data Confidence Manual).

<b>Competencies</b>	<b>Waterwatch monitor competencies</b>	Sample collection (sample collection quality control page 10 WW Victoria Data Confidence Manual); Recording data; field and chemical safety (where applicable);	Sample collection (sample collection quality control page 10 WW Victoria Data Confidence Manual); Recording data; field and chemical safety (where applicable);	Sample collection (sample collection quality control page 10 WW Victoria Data Confidence Manual); Recording data; field and chemical safety (where applicable); Logging of calibration records (post-calibration checks) Participation in regional phys-chem workshops Active participation in regional QA/QC	Sample collection (sample collection quality control page 10 WW Victoria Data Confidence Manual) Thorough use and application of state-wide standard procedures or other specified standards
	<b>Waterwatch coordinator competencies</b>	Thorough use and application of statewide standard procedures or regionally specific procedures. Attendance/participation in state-wide QA/QC program Recommended participation in phys-chem training/refresher courses.	Thorough use and application of statewide standard procedures or regionally specific procedures. Attendance/participation in state-wide QA/QC program Recommended participation in phys-chem training/refresher courses.	Thorough use and application of statewide standard procedures or regionally specific procedures. Attendance/participation in state-wide QA/QC program Recommended participation in phys-chem training/refresher courses.	Thorough use and application of statewide standard procedures or regionally specific procedures. Attendance/participation in state-wide QA/QC program Recommended participation in phys-chem training/refresher courses.
<b>Regional Quality Control Review</b>		Not applicable	Not applicable	Regional parallel testing of field samples to review consistent technique, accuracy and precision (recommended).	Shadow testing in field against other water quality monitoring parties (eg. Contractors, departmental staff) (recommended).
<b>State-wide Quality Control review</b>				Yearly review of regional implementation of Data Confidence Plans	Yearly review of regional implementation of Data Confidence Plans
<b>Monitoring frequency</b>	<b>Physical-chemical parameters</b>	Random	Strategic once a year (min) – quarterly (preferred)	Quarterly (min)	Monthly (min)
<b>Database</b>	<b>Data storage facility</b>	Spreadsheet and/or local catchment database	Regional Waterwatch database	Regional Waterwatch database, DSE Data Warehouse	Regional Waterwatch Database, DSE Data Warehouse
	<b>Data validation</b>	Low level supervision/training		Data entered onto database by coordinator or trained Waterwatchers only. Data entered into database is checked against datasheets for correct transfer, or checked with monitors if considered an anomaly. Datasheets are clearly marked once data is entered onto the database.	Data entered onto database by coordinator or trained Waterwatchers only. Data entered into database is checked against datasheets for correct transfer, or checked with monitors if considered an anomaly. Datasheets are clearly marked once data is entered onto the database.

Waterwatch Victoria Data Confidence Framework					
Indicator: Transparency/Turbidity					
QA/QC Fields	Field specifics	Standard One (1)	Standard Two (2)	Standard Three (3)	Standard Four (4)
<b>Recommended Equipment</b>	<b>Equipment type</b>	Turbidity tube (tube NTUs)	Turbidity tube (tube NTUs)	Turbidity meter (NTUs preferred) or tube (tube NTUs) (demonstrated comparability of tube against turbidity meter required)	Nephelometric turbidity meter (NTU only, in accordance with APHA 1992)
	<b>Range</b>	<10 to 400 tube NTUs	<10 to 400 tube NTUs	Depending on instrument, highest range is likely to be 0 to 999 (variable units)	0 to 999 NTUs
	<b>Resolution</b>	Variable integers along length of tube.	Variable integers along length of tube.	Variable depending on instrument type and specifications.	0.1 NTUs
	<b>Instrument accuracy</b>	NTU scale on side of tube used as an approximation of true NTU measurement only.	NTU scale on side of tube used as an approximation of true NTU measurement only.	Variable, depending on instrument type and specifications.	± 3% reading
<b>Standard Methods</b>	<b>Calibration</b>	No calibration required.	No calibration required.	No calibration required (turbidity tube) Colorimeter may be able to be calibrated (or by manufacturer). Calibration checks (X% transmittance solution) are available for some instruments. Turbidity meter – calibrate against known solutions (deionised water or standard formazin solutions)	Calibrate against deionised water (0 NTU) and span against formazin solutions (<800 NTU, depending on in-field conditions)
	<b>Methods</b>	Waterwatch Victoria Methods manual pg 14	Waterwatch Victoria Methods manual pg 14	Waterwatch Victoria Methods manual pg 14 (turbidity tube only), or other method specific to instrumentation (documented method to be reviewed by Waterwatch Science Coordinator)  In-stream comparative monitoring between turbidity tube and turbidity meter recommended. (Relationship for specific subcatchment/catchment determined by plotting relationship across range of infield NTU values).	Method must be documented for instrument (documented method to be reviewed by Waterwatch Science Coordinator).  MSDS for formazin standard
	<b>Quality Control mechanisms</b>	Not applicable	Waterwatch Victoria Data Confidence Manual: pg 15	Waterwatch Victoria Data Confidence Manual: pg 15 and 30	Waterwatch Victoria Data Confidence Manual: pg 15 and 30 QA/QC checks – accuracy and precision checks (in field and lab)
	<b>Record Keeping</b>	Instrument specification log (purchase date/type/model/contact details for distributor)	Instrument specification log (purchase date/type/model/contact details for distributor) Logs for coordinators noting training type and date, skills learned (noting competency) and the trainer's name (see page 24 of WW Vic Data Confidence Manual).	Instrument specification log (purchase date/type/model/contact details for distributor) Calibration log (colorimeter/turbidity meter) Equipment maintenance/servicing log (colorimeter/turbidity meter) Logs for coordinators and Waterwatch monitors, noting training type and date, skills learned (noting competency) and the trainer's name (see page 24 of WW Vic Data Confidence Manual).	Instrument specification log (purchase date/type/model/contact details for distributor) Calibration log Equipment maintenance/servicing log Logs for coordinators and Waterwatch monitors, noting training type and date, skills learned (noting competency) and the trainer's name (see page 24 of WW Vic Data Confidence Manual).

	<b>Waterwatch monitor competencies</b>	Sample collection (sample collection quality control page 10 WW Victoria Data Confidence Manual); Recording data; field and chemical safety (where applicable);	Sample collection (sample collection quality control page 10 WW Victoria Data Confidence Manual); Recording data; field and chemical safety (where applicable);	Sample collection (sample collection quality control page 10 WW Victoria Data Confidence Manual); Recording data; field and chemical safety (where applicable); Logging of calibration records (post-calibration checks) Participation in regional phys-chem workshops Active participation in regional QA/QC	Sample collection (sample collection quality control page 10 WW Victoria Data Confidence Manual) Thorough use and application of state-wide standard procedures or other specified standards (eg. APHA)
	<b>Waterwatch coordinator competencies</b>	Thorough use and application of statewide standard procedures or regionally specific procedures. Attendance/participation in state-wide QA/QC program Recommended participation in phys-chem training/refresher courses.	Thorough use and application of statewide standard procedures or regionally specific procedures. Attendance/participation in state-wide QA/QC program Recommended participation in phys-chem training/refresher courses.	Thorough use and application of statewide standard procedures or regionally specific procedures. Attendance/participation in state-wide QA/QC program Recommended participation in phys-chem training/refresher courses.	Thorough use and application of statewide standard procedures or regionally specific procedures. Attendance/participation in state-wide QA/QC program Recommended participation in phys-chem training/refresher courses.
<b>Regional Quality Control Review</b>		Not applicable		Regional parallel testing of field samples to review consistent technique, accuracy and precision (recommended).	Shadow-testing in field against other water quality monitoring parties (eg. Contractors, departmental staff) (recommended). Regional mystery samples for volunteers to measure (at least 2 times per year) for core indicators
<b>State-wide Quality Control review</b>		State-wide mystery samples (June): groups are encouraged to test their measurement technique against mystery solutions.	State-wide mystery samples (June): groups are encouraged to test their measurement technique against mystery solutions.	State-wide mystery samples (June): depending on instrument used, groups should be attempting to fall within acceptable limits ( $\pm 20\%$ NTUs – meters, $\pm 25\%$ - tubes) Yearly review of regional implementation of Data Confidence Plans	State-wide mystery samples (June): groups expected to fall consistently within acceptable limits ( $\pm 20\%$ NTUs) Yearly review of regional implementation of Data Confidence Plans
<b>Monitoring frequency</b>	<b>Physical-chemical parameters</b>	Random	Strategic once a year (min) – quarterly (preferred)	Quarterly (min)	Monthly (min)
<b>Database</b>	<b>Data storage facility</b>	Spreadsheet and/or local catchment database	Regional Waterwatch database	Regional Waterwatch database, DSE Data Warehouse	Regional Waterwatch Database, DSE Data Warehouse
	<b>Data validation</b>	Low level supervision/training	Data entered onto database by coordinator or trained Waterwatchers only. Data entered into database is checked against datasheets for correct transfer, or checked with monitors if considered an anomaly. Datasheets are clearly marked once data is entered onto the database.	Data entered onto database by coordinator or trained Waterwatchers only. Data entered into database is checked against datasheets for correct transfer, or checked with monitors if considered an anomaly. Datasheets are clearly marked once data is entered onto the database.	Data entered onto database by coordinator or trained Waterwatchers only. Data entered into database is checked against datasheets for correct transfer, or checked with monitors if considered an anomaly. Datasheets are clearly marked once data is entered onto the database.



**Waterwatch Victoria Data Confidence Framework**  
**Indicator: Temperature**

QA/QC Fields	Field specifics	Standard One (1)	Standard Two (2)	Standard Three (3)	Standard Four (4)
<b>Recommended Equipment</b>	<b>Equipment type</b>	Thermometer	Thermometer (may be function of pH, EC or DO meter)	Thermometer (may be function of pH, EC or DO meter)	Thermometer (may be function of pH, EC or DO meter)
	<b>Range</b>	-5 to 50 °C	-5 to 50 °C	-5 to 50 °C	-5 to 50 °C
	<b>Resolution</b>	1 °C	1 °C	0.5 °C	0.1 °C
	<b>Instrument accuracy</b>	± 1°C	± 1°C	± 0.5°C	± 0.5°C Ensure thermometer is able to accurately measure temperature in solution, not just in air.
<b>Standard Methods</b>	<b>Calibration methods</b>	Not required	Check against precision thermometer recommended	Check against precision thermometer (in solution)	Check against precision thermometer (in solution)
	<b>Sampling and measurement methods</b>	Waterwatch Victoria Methods manual: pg 4	Waterwatch Victoria Methods manual: pg 4	Waterwatch Victoria Methods manual: pg 4	Waterwatch Victoria Methods manual: pg 4. Time of day must be recorded with temperature measurements.
	<b>Quality Control</b>	Not required	Waterwatch Victoria Data Confidence manual: pg 16	Waterwatch Victoria Data Confidence manual: pg 16 and 30	Waterwatch Victoria Data Confidence manual: pg 16 and 30 Checked against precision thermometer and (where possible) a range of known water temperatures (0, 20 and 40°C)
	<b>Record Keeping</b>	Instrument specification log (purchase date/type/model/contact details for distributor)	Instrument specification log (purchase date/type/model/contact details for distributor) Logs for coordinators noting training type and date, skills learned (noting competency) and the trainer's name (see page 24 of WW Vic Data Confidence Manual).	Instrument specification log (purchase date/type/model/contact details for distributor) Accuracy Log (against precision thermometer) Equipment maintenance/servicing log Logs for coordinators and Waterwatch monitors, noting training type and date, skills learned (noting competency) and the trainer's name (see page 24 of WW Vic Data Confidence Manual).	Instrument specification log (purchase date/type/model/contact details for distributor) Accuracy log (against precision thermometer) Equipment maintenance/servicing log Logs for coordinators and Waterwatch monitors, noting training type and date, skills learned (noting competency) and the trainer's name (see page 24 of WW Vic Data Confidence Manual).
<b>Competencies</b>	<b>Waterwatch monitor competencies</b>	Sample collection (sample collection quality control page 10 WW Victoria Data Confidence Manual); Recording data; field and chemical safety (where applicable);	Sample collection (sample collection quality control page 10 WW Victoria Data Confidence Manual); Recording data; field and chemical safety (where applicable);	Sample collection (sample collection quality control page 10 WW Victoria Data Confidence Manual);	Sample collection (sample collection quality control page 10 WW Victoria Data Confidence Manual) Recording data; field and chemical safety (where applicable); Participation in regional phys-chem workshops Active participation in regional QA/QC Thorough use and application of state-wide standard procedures or other specified standards

	<b>Waterwatch coordinator competencies</b>	Thorough use and application of statewide standard procedures or regionally specific procedures. Attendance/participation in state-wide QA/QC program Recommended participation in phys-chem training/refresher courses.	Thorough use and application of statewide standard procedures or regionally specific procedures. Attendance/participation in state-wide QA/QC program Recommended participation in phys-chem training/refresher courses.	Thorough use and application of statewide standard procedures or regionally specific procedures. Attendance/participation in state-wide QA/QC program Recommended participation in phys-chem training/refresher courses.	Thorough use and application of statewide standard procedures or regionally specific procedures. Attendance/participation in state-wide QA/QC program Recommended participation in phys-chem training/refresher courses.
<b>Regional Quality Control Review</b>		Not applicable	Not applicable	Regional parallel testing of field samples to review accuracy and precision (recommended)	Shadow-testing in field against other water quality monitoring parties (eg. Contractors, departmental staff) (recommended).
<b>State-wide Quality Control review</b>		Not applicable	Not applicable	Parallel testing of field samples to review accuracy and precision (recommended)	Parallel testing of field samples to review accuracy and precision (recommended).
<b>Monitoring frequency</b>	<b>Physical-chemical parameters</b>	Random	Strategic once a year (min) – quarterly (preferred)	Quarterly (min)	Monthly (min)
<b>Database</b>	<b>Data storage facility</b>	Spreadsheet and/or local catchment database	Regional Waterwatch database	Regional Waterwatch database, DSE Data Warehouse	Regional Waterwatch Database, DSE Data Warehouse
	<b>Data validation</b>	Low level supervision/training	Data entered onto database by coordinator or trained Waterwatchers only. Data entered into database is checked against datasheets for correct transfer, or checked with monitors if considered an anomaly. Datasheets are clearly marked once data is entered onto the database.	Data entered onto database by coordinator or trained Waterwatchers only. Data entered into database is checked against datasheets for correct transfer, or checked with monitors if considered an anomaly. Datasheets are clearly marked once data is entered onto the database.	Data entered onto database by coordinator or trained Waterwatchers only. Data entered into database is checked against datasheets for correct transfer, or checked with monitors if considered an anomaly. Datasheets are clearly marked once data is entered onto the database.

Waterwatch Victoria Data Confidence Framework					
Indicator: Reactive Phosphorus (Ortho-phosphate)					
QA/QC Fields	Field specifics	Standard One (1)	Standard Two (2)	Standard Three (3)	Standard Four (4)
<b>Recommended Equipment</b>	<b>Equipment type</b>	Presence/absence test kits	Phosphate colour comparators	Phosphate colour comparators Instrument ranges appropriate for in-stream measurement.	Colorimeters/photometers Instrument ranges appropriate for in-stream measurement.
	<b>Range</b>		Variable range depending on instrument. Low range commonly 0 – 0.2 mg P L <sup>-1</sup> High range commonly 0.05 – 1 mg P L <sup>-1</sup>	Variable range depending on instrument. Low range commonly 0 – 0.2 mg P L <sup>-1</sup> High range commonly 0.05 – 1 mg P L <sup>-1</sup>	Variable range depending on instrument. Low range commonly 0 – 4mg P L <sup>-1</sup>
	<b>Resolution</b>		Variable integers based on colour discrimination. Commonly between 0.015 and 0.02 mg P L <sup>-1</sup> (low range) or 0.1 and 0.2 mg P L <sup>-1</sup> (high range)	Variable increments based on colour discrimination. Commonly between 0.015 and 0.03 mg P L <sup>-1</sup> or 0.1 and 0.2 mg P L <sup>-1</sup> (high range)	Variable increments within range.
	<b>Instrument accuracy</b>	Not applicable	Not specified	± 0.02 mg/L (Low) ± 0.1 mg/L (High)	± 0.02 mg/L across range
<b>Standard methods</b>	<b>Calibration methods</b>	Not applicable	Not applicable	Not applicable	Colorimeter calibration graphs (curves) with known standards
	<b>Sampling and measurement methods</b>	Waterwatch Victoria Methods manual: pg 16-17	Waterwatch Victoria Methods manual: pg 16-17	Waterwatch Victoria Methods manual: pg 16-17	Waterwatch Victoria Methods manual: pg 16-17
	<b>Quality Control mechanisms</b>	Not applicable	Waterwatch Victoria Data Confidence Manual: pg 14	Waterwatch Victoria Data Confidence Manual: pg 14 and 30	Waterwatch Victoria Data Confidence Manual: pg 14 and 30 QA/QC checks – regular checks against blank samples (deionised water) and/or solutions of known transmittance
	<b>Record Keeping</b>	Instrument specification log (purchase date/type/model/contact details for distributor)	Instrument specification log (purchase date/type/model/contact details for distributor) Calibration log Equipment maintenance/servicing log Logs for coordinators, noting training type and date, skills learned (noting competency) and the trainer's name (see page 24 of WW Vic Data Confidence Manual).	Instrument specification log (purchase date/type/model/contact details for distributor) Calibration log Equipment maintenance/servicing log Logs for coordinators and Waterwatch monitors, noting training type and date, skills learned (noting competency) and the trainer's name (see page 24 of WW Vic Data Confidence Manual).	Instrument specification log (purchase date/type/model/contact details for distributor) Calibration check log Equipment maintenance/servicing log Logs for coordinators and Waterwatch monitors, noting training type and date, skills learned (noting competency) and the trainer's name (see page 24 of WW Vic Data Confidence Manual).

<b>Competencies</b>	<b>Waterwatch monitor competencies</b>	Sample collection (sample collection quality control page 10 WW Victoria Data Confidence Manual); Recording data; field and chemical safety (where applicable);	Sample collection (sample collection quality control page 10 WW Victoria Data Confidence Manual); Recording data; field and chemical safety (where applicable);	Sample collection (sample collection quality control page 10 WW Victoria Data Confidence Manual); Recording data; field and chemical safety (where applicable); Logging of calibration records (post-calibration checks) Participation in regional phys-chem workshops Active participation in regional QA/QC	Sample collection (sample collection quality control page 10 WW Victoria Data Confidence Manual) Thorough use and application of state-wide standard procedures or other specified standards
	<b>Waterwatch coordinator competencies</b>	Thorough use and application of statewide standard procedures or regionally specific procedures. Attendance/participation in state-wide QA/QC program Recommended participation in phys-chem training/refresher courses.	Thorough use and application of statewide standard procedures or regionally specific procedures. Attendance/participation in state-wide QA/QC program Recommended participation in phys-chem training/refresher courses.	Thorough use and application of statewide standard procedures or regionally specific procedures. Attendance/participation in state-wide QA/QC program Recommended participation in phys-chem training/refresher courses.	Thorough use and application of statewide standard procedures or regionally specific procedures. Attendance/participation in state-wide QA/QC program Recommended participation in phys-chem training/refresher courses.
<b>Regional Quality Control Review</b>		Not applicable	Not applicable	Regional mystery samples for volunteers to measure (at least 2 times per year) for core indicators (encouraged)	Regional mystery samples for volunteers to measure (at least 2 times per year) for core indicators
<b>State-wide Quality Control review</b>		State-wide mystery samples (June) (participation optional)	State-wide mystery samples (June) (participation encouraged)	State-wide mystery samples (June): groups expected to fall consistently within acceptable limits ( $\pm 20\%$ actual mg/L value) Yearly review of regional implementation of Data Confidence Plans	State-wide mystery samples (June): groups expected to fall consistently within acceptable limits ( $\pm 20\%$ actual mg/L value) Yearly review of regional implementation of Data Confidence Plans
<b>Monitoring frequency</b>	<b>Physical-chemical parameters</b>	Random	Strategic once a year (min) – quarterly (preferred)  Rain event monitoring (optional)	Quarterly (min)  Rain event monitoring (optional)	Monthly (min)  Rain event monitoring (optional)
<b>Database</b>	<b>Data storage facility</b>	Spreadsheet and/or local catchment database	Regional Waterwatch database	Regional Waterwatch database, DSE Data Warehouse	Regional Waterwatch Database  Note: Total P desirable for addition to DSE Data Warehouse
	<b>Data validation</b>	Low level supervision/training	Data entered onto database by coordinator or trained Waterwatchers only. Data entered into database is checked against datasheets for correct transfer, or checked with monitors if considered an anomaly. Datasheets are clearly marked once data is entered onto the database.	Data entered onto database by coordinator or trained Waterwatchers only. Data entered into database is checked against datasheets for correct transfer, or checked with monitors if considered an anomaly. Datasheets are clearly marked once data is entered onto the database.	Data entered onto database by coordinator or trained Waterwatchers only. Data entered into database is checked against datasheets for correct transfer, or checked with monitors if considered an anomaly. Datasheets are clearly marked once data is entered onto the database.