Koi Pond Water Parameters: The Reference Table

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In short

- pH anywhere from 7.0 to 8.5 is acceptable. Stability matters more than the exact figure.
- KH — labeled *total alkalinity* on most US test kits — should sit at 6–10 dKH (105–180 ppm). Below 5 dKH the pond loses its grip on pH; below 3 dKH the situation is critical.
- Ammonia and nitrite target zero. Nitrate is tolerable and mostly reports how heavy the load is.
- Dissolved oxygen at 8–10 mg/L is comfortable, 7 mg/L is the practical floor, and it is by far the fastest-moving number on the list.

PARAMETER	TARGET	WHAT AN OFF READING MEANS	HOW FAST IT CAN MOVE
Temperature	65–75 °F (18–24 °C) active range; koi tolerate roughly 39–85 °F (4–29 °C)	High temperature raises metabolism and lowers the water's oxygen ceiling at the same time. Rapid change is more stressful than the absolute value.	Hours. A shallow pond can move several degrees between dawn and mid-afternoon; a cold front or a large top-up moves it faster.
pH	7.0–8.5, stable	A number outside the band is worth correcting; a number that *swings* is worth investigating first. Wide daily movement points to a thin buffer or a heavy algae load.	Within a single day. Photosynthesis pushes pH up through the afternoon and lets it fall overnight. A crash can arrive in one night once the buffer is gone.
KH / total alkalinity	6–10 dKH (105–180 ppm)	Below 5 dKH the pond can no longer hold pH steady. Below 3 dKH is critical — this is the condition a pH crash comes from.	Weeks under normal conditions, as nitrification consumes it. Hours after heavy rain, a large soft-water top-up, or an acid load.
GH / general hardness	Roughly 60–200 ppm as a mineral baseline	A measure of calcium and magnesium — osmotic comfort and bone or scale mineralization. It is **not** the buffer and will not stop a pH crash.	Months. Effectively a property of your source water.
Ammonia (free NH_3)	0 ppm	Any detectable free ammonia is gill damage in progress. Toxicity climbs sharply with both pH and temperature, which is why the same total-ammonia reading is far more serious at pH 8.5 and 82 °F than at pH 7.0 and 60 °F.	Hours. Overfeeding, a cleaned or medicated filter, or a dead fish out of sight will produce a reading by the next morning.
Ammonium (NH_4^+)	Low and stable	The ionized, far less toxic form. Most US hobby kits report the two together as total ammonia nitrogen; the split between them is set by pH and temperature, not by the kit.	Hours, alongside free ammonia.
Nitrite (NO_2^-)	0 ppm	Acutely toxic. It binds hemoglobin and starves the fish of oxygen in water that tests fine for oxygen. Fish gasp at the surface with no obvious cause.	Hours to days. The classic spike is two to five days after a biofilter is disturbed, medicated, or overloaded.
Nitrate (NO_3^-)	Ideally below 40 ppm	Tolerated at levels that would be unacceptable for ammonia or nitrite. Treat it as a load indicator: rising nitrate means feeding, stocking, or water-change volume is out of balance.	Weeks. Slow accumulation between water changes.
Dissolved oxygen	8–10 mg/L comfortable; 7 mg/L the practical floor	Below 6 mg/L is measurable stress. Below 4 mg/L is acutely dangerous. Warm water simply cannot hold as much oxygen, exactly when the fish need more of it.	Minutes to hours. The daily minimum is just before dawn. A warm, heavily stocked pond can fall from comfortable to dangerous in one night.

PARAMETER	TARGET	WHAT AN OFF READING MEANS	HOW FAST IT CAN MOVE
Salinity	Baseline near zero; therapeutic use typically around 0.3% (3 ppt) for a limited period	Used deliberately as a treatment, not as a permanent condition. Left in place indefinitely it selects for salt-tolerant parasites and complicates every other reading.	Only when you change it. It falls gradually with water changes and rain, which is why treatments quietly drift off dose.
Conductivity / TDS	No single correct figure — know your own baseline	A rising baseline usually means dissolved load is accumulating faster than water changes remove it. Useful mainly as a change signal.	Days to weeks, unless salt or minerals are added.
ORP (redox)	Commonly 250–400 mV in a clean pond; read as a trend	A sustained drop suggests organic load rising faster than the system oxidizes it. The absolute number depends on probe and water chemistry, so compare it against your own history, not someone else's.	Minutes to hours. Responds quickly to organic load, UV, and ozone.
Turbidity	Low single-digit NTU in a clear pond; read as a trend	A sudden rise means solids in suspension — a stirred bottom, a failing filter, or an algae bloom collapsing.	Minutes. One of the quickest indicators that something mechanical has changed.
Blue-green algae (phycocyanin) — *optional channel*	No fixed target; read against your own baseline	Phycocyanin is the pigment specific to cyanobacteria, so a rising signal points at a blue-green bloom rather than green algae or stirred-up silt. It is a trend, not a cell count, and it says nothing about toxins.	Days. A blue-green bloom builds over a warm, still spell rather than overnight.