H2-Oh Yea!

Importance of water quality for aquatic turtles

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- Practical Monitoring
  - What to look for?
  - What to test for?
- Filtration Basics
  - Types of filtration
  - What matters in practice
- Troubleshooting
  - 3 common problems
- Monitoring Program
  - Logs
  - Cleaning schedule

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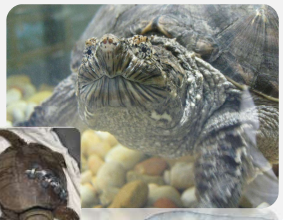
Water Quality is Clinical Care

Tank conditions are part of the treatment plan

Why it matters for patients

Tank conditions support healing:
- Temperature
- pH
- salinity

Poor water quality:
- slow wound healing
- increases stress
- can worsen respiratory/skin issues



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Stability > Perfection

Water Parameters

- Temperature
- pH
- Salinity
- Ammonia
- Nitrites
- Nitrates
- Phosphate

Water temperature: the metabolic 'dial'

- How it affects the turtle:
  - Metabolism
  - Immune system
  - Digestion

How it affects water quality:

High temp= faster changes:
- Waste
- Bacteria growth

Low temp= slower changes:
- Mask problems

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Typical temperature ranges

- Specie-specific;
- POTZ (Preferred Optimal Temperature Zone)
- Debilitated/sick turtles need a slightly higher temperature
  - 4 degrees higher than its normal preferred temperature

Most turtles 70-80°F

This adjustment should always be:
- Intentional
- Gradual
- Monitored closely

Heater safety

Use a thermostat when possible.

Shield heaters from direct contact, turtle will pushed them out.

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pH

- pH measures how acidic or basic water is

How it affects the turtle:	How it affects water quality:	Reflects system stability
• Fast pH swings stress turtle • Skin, eye and shell lesions	• Can change ammonia toxicity	• Buffering capacity • Excess waste load • Over-cleaning bio filters • Substrates or decor

Optimal pH range 7.4-7.8

Acidic 14
Neutral 7
Basic 1

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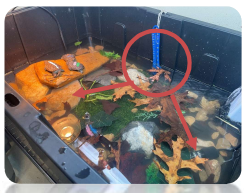
pH probe and pool thermometers

- Measure in the water!



- Easy to read at a glance
- Can be cost-effective
- Durable
- Keep calibrated
- And they stay *in the water*, so we're not guessing

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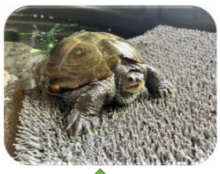
Salinity (if applicable)

- Measure of all dissolved salts within a solution
- Metric unit is grams per liter (g/L)
  - Note: g/L = ppt (parts per thousand)
- Use a refractometer for accuracy



Brackish water species

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Therapeutic low-salinity setup

- A temporary low salinity setup
  - Reason:
    - Help support healing for skin/shell issues & minor wounds
    - Can reduce surface bacteria/fungal load
    - Creates a treatment environment that may improve healing conditions
- Concentration: ≈ 5-6 ppt

Quick math

- 20g of salt/gallon of water

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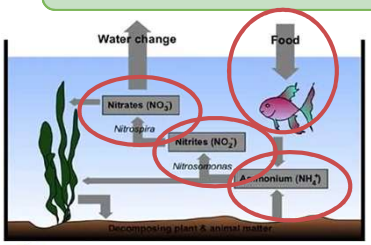
The Nitrogen Cycle in turtle tanks



- Backbone of all filtrations
- How nitrogen from air, converts to other forms and back to nitrogen

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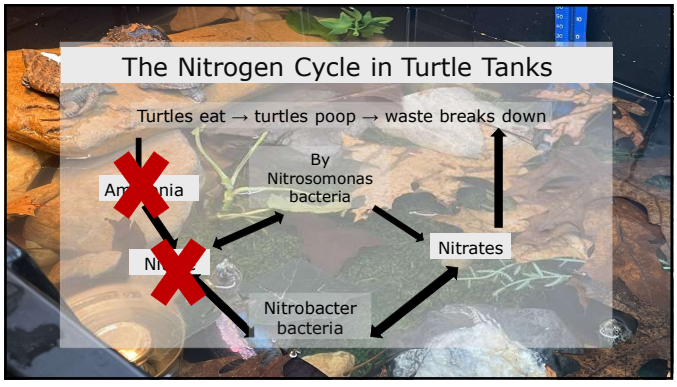

Ammonia(NH3/NH4) = the emergency parameter

- **Sources:**
  - Urates/feces + decomposing food/organic debris.
- **Common causes:**
  - Risk goes up fast in small tanks
  - new setup
  - After deep clean of bio media
  - Higher temperature and higher pH increase the more toxic form (NH_3

Clinically, ammonia exposure looks like:
- Lethargy
- Reduced appetite
- Skin and shell irritation
- Wounds that suddenly stop improving

Ammonia (NH_3/NH_4^+) TOXIC

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Nitrite (NO2): the 'new tank' and 'overloaded filter' warning

- **Sources:**
  - Bio filter is active but not keeping up
- **Causes:**
  - Newly set tank
  - After filter disruptions
  - When waste load suddenly increases.

Nitrite (NO_2^-) TOXIC

Clinically, nitrite exposure can look subtle:
- Reduced activity
- Poor appetite
- Slower recovery
- "Something's off" behavior rather than an obvious crash

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Nitrate (NO4-), organics, and algae: 'not urgent' but very actionable

- Nitrate is less toxic than ammonia/nitrite
- **Causes:**
  - Water changes aren't keeping up
  - High nitrate + strong light = algae blooms.

Nitrate (NO_3^-) Less toxic

Clinically, high nitrate environments often show up as:
- Slower wound healing
- Chronic shell or skin issues
- Tanks that "never quite look clean," even with frequent spot cleaning

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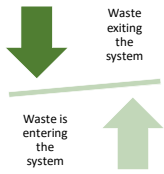
Phosphate (PO_4) : the algae fuel

- Not usually *directly* toxic to turtles
- **Feeds algae and biofilm** and signals **nutrient buildup**.
- High phosphate often shows up as **green water, slimy film, faster odor**, and "gunky" surfaces



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When Phosphate (PO_4) climbs

This is especially common in rehab tanks because:

High phosphate

- Feeding is heavy and frequent
- Patients are messy eaters
- Tanks are often small and temporary

Water change
Rinse mechanical media
Phosphate-absorbing media

Lower Phosphate

Guardrails

- **< 0.3 mg/L:** great/low nutrient pressure
- **> 0.3–1.0 mg/L:** workable but watch for algae/biofilm; tighten export
- **1.0 mg/L:** high nutrient loading; expect algae/biofilm + "dirty-water" conditions unless corrected

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Testing: keep it consistent (and cheap)

- Liquid drop tests are accurate and cost-effective for rehab workflow.

Practical workflow tip:

- Sample from the "worst" systems first (highest bio load, new tanks, patients on heavy diets).
- Document anything unusual during sampling (odor, color, poor flow, feces buildup).

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Testing Trends

Parameter	Goal	How often	Tool
Temperature	Species-appropriate; health status	Daily	Thermometer /probe
pH	stable	Daily	Strips/ drops
Salinity	Specie-Specific or therapeutic	Daily	Refractometer
Ammonia (NH_3/NH_4^+)	0 detectable	Weekly	Colorimeter Test
Nitrite (NO_2^-)	0 detectable	Weekly	Colorimeter Test
Nitrate (NO_3^-)	Keep low; use trends	Weekly	Colorimeter Test
Phosphate (PO_4)	stable	Weekly	Strips/probe

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Filtration 101:

Three jobs, one goal (stable water)

Mechanical
Catches particles
- Foam pads
- Filter floss
- Pre-filters
- Rinse often

Biological
Processes nitrogen waste
- Bio rings/sponge
- Needs oxygen + flow
- Do not replace all at once

Chemical
Removes toxins
- Activated carbon
- Removes(odor/meds)
- Replace on schedule
- Optional

Do not replace all biological media at once.

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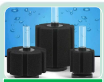
Filtration That Keeps Up with Turtles

- **Turtles require over-filtration**.
  - Aim for high turnover and lots of biological media (turtles are messy).
  - Size filters bigger than the label suggests
  - The bigger the filter the more stable



Sponge filter
- Cheap + safe
- Good aeration
- Limited media volume

Hanging filters
- Easy access
- OK for light loads
- Small media space

Internal filter
- Compact
- Easy to install
- In-tank clutter; clog fast

Canister filters
- Large media volume
- Customizable
- Handles heavy bio load

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Canister Filters : More media, More stability

Advantages:

- More media volume
  - Stronger biological filtration= more stable water quality
- Customize layers
  - Arrange mechanical -> chemical -> biological to fit your needs
- Flexible Intake + output
  - Place for circulation + surface agitation where you need it

Limitations:

- Higher upfront cost
  - Unit + Media + replacement parts
- Space & logistics
  - Gravity fed, room for canister, hose routing
- Maintenance Time
  - Canister clean outs take longer

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Proper filtration: Set up media with biology in mind

Mechanical (catch waste first)
- Course sponge -> medium sponge

Chemical (optional/targeted)
- Activated carbon
- Ammonia removers
- Specialty resins

Biological (your "bio filter")
- Ceramics rings/bio balls
- Keep wet +flowing; don't replace at once

Rule of thumb
- Avoid over-cleaning
- Rinse media in tank water
- Clean mechanical filter often, clean bio lightly
- Stagger media cleanings

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Troubleshooting:

what you see → what you do

What you notice	Most common cause	First move
Cloudy water	Suspended waste / overfeeding / weak mechanical filtration	Stop feeding 24 hrs; spot-clean; rinse mechanical media
Stinky / "swamp" smell	Decomposing organics + overloaded biofilter	Test ammonia/nitrite; remove waste; partial water change
Green water / algae	Excess nutrients + light	Reduce light; increase water changes; feed in separate tub
Foam / film	Dissolved organics	Increase mechanical/chemical filtration; water change
Turtle suddenly lethargic	Temp swing or toxic spike	Check temp; test ammonia/nitrite immediately; correct fast

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Always confirm with tests. Don't troubleshoot by guessing.

Stability matters more than 'perfect' numbers

Avoid Chasing pH with frequent additives without understanding the cause.

If ammonia is detectable:

- Partial water change (start 25–50%).
- Remove all waste.
- Increase aeration/flow; verify filter function.
- Re-test in 24 hours (sooner if severe).

If nitrite is detectable:

- Partial water change (25–50%) and remove organics.
- Confirm bio-media is present, wet, and receiving good flow.
- Increase testing frequency until it returns to zero.

Best controls for nitrates:

- Trend-based partial water changes
- Strong mechanical filtration + regular spot-cleaning
- Feed turtles in separate tub when feasible (less waste in the main system).

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Monitoring Program:

without burning people out

Dail:

- check
- log
- act

Weekly:

ew

This structure:

- Spreads labor over time
- Protects biological filtration
- Makes expectations clear for rotating staff and interns
- And prevents "panic cleaning" after problems appear

ly:

- Maintenance
- Substrate clean
- Furniture clean

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The daily workflow

1. Observe: appetite, buoyancy, behavior, skin/eyes, odor/clarity
2. Check temperature + pH + Salinity, scoop any visible waste
3. Check equipment (heater, filter flow, air stone)
4. Record results + actions taken (water change %, filter cleaned, feeding notes)

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Logging that actually helps you

Make it shift-proof
Use the same kit, same method, same thresholds.

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Cleaning schedule (built around test results)

STATUS	Results & Observations	Tasks (keep it simple)
GREEN (OK)	• Normal behavior + clear water, parameter WNL • Ammonia 0, Nitrite 0	Continue routine schedule EOW 25%, Weekly mechanical filter rinse
YELLOW (WATCH)	• Cloudy water, mild odor, reduced flow, algae bloom • Nitrate creeping up	Scheduled 25-50% partial water change
RED (ACT NOW)	• Detectable ammonia OR/AND nitrite with 0 nitrates • Strong odor	Immediate 50% water change Check biofilter & retest after intervention

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Cleaning schedule (for stable set ups)

Weekly:
- Partial water changes based on nitrate trends and visual assessment.

Bio-media:
(Monthly if needed)
- gentle rinse w/ tank water *only when needed*; never replace all at once.

Filter maintenance:
(Every other week/weekly)
- Rinse mechanical media;
- Clean impellers when the flow drops.

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Biosecurity: don't move pathogens tank-to-tank

- Dedicated tools per tank whenever possible (nets, scrubbers, siphons).
- Disinfect cleaning equipment after each use
  - (Bleach soak->Thio soak)
- Use individual cups/vials for probes; avoid dipping shared droppers across tanks.

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Wood turtle case study

Exposed chronic ulna fracture and plastron fractures → Amputation; Neck lesions from handling → Anorexia, wounds were getting worse → Moved to a low-salinity setup → Started eating , healing, very BAR → Released in Spring

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Key takeaways

Test first.Guessing wastes time and animals pay the price.

↓

Detectable ammonia or nitrite is an urgent husbandry problem—act the same promptly.

↓

Protect your biofilter (bacteria) and you protect your turtles.

↓

Simple records turn water quality into a manageable system.

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Questions?

References

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Questions?



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