Intended Topics

- Low-Cost Underwater Camera Types
- General Tips
- Composition
- Camera Shooting Modes
- Exposure
- Strobe Placement
- Q & A
Difference Between Low-Cost Underwater Cameras Types

- **Point and Shoot**
  Low cost, smaller sensor, less control, small housing

- **Small Video Camera**
  Single-shot mode, limited exposure controls(?), size varies
General Tips

- Before using underwater camera have
  - Positional awareness
  - Buoyancy control
- Ashore
  - Get familiar with equipment
  - Read owner’s manual
  - Check and prepare equipment before getting wet
- Underwater
  - Be aware of sun angle
  - Take LOTS of photos
General Tips: Don’t Hunt

- Camera lens are big eyes from a fish’s perspective
- Move slowly—fish sense water pressure changes
- Be patient—really patient*
- Zoom with your fins

*Imax Camera

*A serious U/W photographer’s buddy is the camera—not you.
General Tips: Focus

- Focus on subject’s eyes
- Cameras require subject to be well lit for autofocus to work.
- Consider presetting focus point to decrease shutter lag
- Increase/decrease depth of field - varies with aperture, lens length, distance
General Tips: Flood Prevention

- Physical contact squeezing O-ring on both sides of housing keeps out water
- Lube is your friend—keeps O-ring flexible, squeezable
- Lube is your enemy—traps dust, threads, hair, etc.
- O-ring should look wet, but not have globs of lube on it
- Check seals in a well-lit place - dust, threads, and hair hide in shadows
- Check for flooding in rinse tank or at surface
General Tips: Equipment Insurance

- Not If—When
- DAN Equipment Insurance
General Tips: Adding Equipment

1. Start with camera and housing
2. Add equipment in this order:
   1. External Strobe or Video Light
   2. Focusing Light
   3. Macro or Fisheye Lens, if possible
   4. Fisheye or Macro Lens, if possible
   5. 2\textsuperscript{nd} External Light
Quick Overview of Composition

- Subject Placement
- Rule of Thirds
- Converging Lines
- Repetitive Shapes
- Framing
- Negative Space
Composition: Subject Placement

- Get close, low, and shoot up
- Get even closer and lower
- Get even closer and lower
- Subject moving into photo
Composition: Rule of Thirds

Image by Matt Weiss
Composition: Converging Lines
Composition: Repetitive Shapes
Composition: Framing
Composition: Negative Space
Camera Shooting Modes

- **Automatic**: Camera controls everything
- **Shutter Priority**: Camera adjusts aperture based on photographer’s selected shutter speed, et al.
- **Aperture Priority**: Camera adjusts shutter speed based on photographer’s selected aperture, et al.
- **Program**: Camera controls shutter speed and aperture, photographer sets everything else
- **Manual**: Photographer controls everything
Exposure

- Shutter Speed
- F-Stop
- ISO
- Strobe Intensity
- Histogram
- White Balance
Exposure: Shutter Speed

- Controls how long light is on sensor
- Faster speeds used to stop action
- Slower speeds used to show movement
- Don’t set shutter speed faster than flash sync

1, 1/2, 1/4, 1/8/, 1/15, 1/30, 1/60, 1/125, 1/250, 1/500, 1/1000, etc.
Exposure: F-Stop

- Lower numbers let in more light, reduce depth of field
- Higher numbers reduce light, increase depth of field
- Berkley White suggests using f-stop to adjust background exposure

f-1.2, f-2.0, f-4.0, f-5.6, f-8, f-11, f-16, f-22, f-32, etc.
Exposure: ISO

- Low numbers decrease sensors sensitivity to light, decrease digital noise
- High numbers increase sensitivity to light, increase digital noise
# Exposure: Shutter Speed/Aperture Relationship

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EV=Exposure Value
Exposure: Strobe Intensity

- Water absorbs colors
- Strobes restore “natural” colors to subject
- Used to illuminate near subjects
- Remember water absorbs light horizontally too
Exposure: Histogram

**UNDEREXPOSED**
Difficult to recover in post process. Results in overly noisy photographs. Avoid underexposure at all costs. Use a lower f/number, or lengthen the time the shutter is open.

**EXPOSED TO THE LEFT**
Generally acceptable, most common nightscape exposure with standard settings. Photo may get noisier if pushed in post process. Use a lower f/number or shutter speed if possible.

**NEUTRAL EXPOSURE**
Safest exposure. Results may appear brighter than natural in the camera but can be easily pulled in post process. No need to change any settings.

**EXPOSED TO THE RIGHT**
Best choice for the lowest noise but requires care not to overexpose. Results will look overly bright in the camera but can be easily corrected in post process.

**OVEREXPOSED**
Difficult to recover in post process if highlights are overblown. Rarely occurs unless affected by moonlight or extreme light pollution. Use a lower ISO setting if overexposed.
Exposure: White Balance

Digital cameras are very sensitive to white balance

- Auto
- Daylight
- Cloudy
- Incandescent
Exposure: White Balance

Underwater options:
1. Automatic
2. Set white balance to Flash if using strobe
3. Manually set white balance and reset as needed
4. Use “underwater scene” mode
Working With Strobes

- No Strobes
- Built-In Camera Flash
- External Strobe(s)
  - Strobe Arcs
  - Strobe Direction
Working With Strobes: No Strobes

- Strobes may not be needed in clear water near surface
Working With Strobes: Built-In Camera Flash

- No additional cost
- Provides only face-on lighting
- Increases backscatter
- Eliminates shadows and flattens scene
Working With Strobes: Strobe Arcs

- Cone of light
- Put subject just inside cone to reduce backscatter
- Good idea to keep strobe facing forward and move strobe laterally
Working With Strobes: Strobe Direction

- Be aware of
  - Where strobe is pointing (remember cone)
  - Objects blocking flash and creating shadows
- Most natural lighting is from the top
- Buy long strobe arms
Q & A