Weedy Seadragon Ecology Project

Annual Report 2015

Underwater Research Group of NSW
Fish Ecology Lab, UTS

1. Summary

UTS and URG forged an informal partnership in 2015, to further the seadragon research studies at UTS since 2002 and value-add URGs long-term interest in dragons. Dave and Selma from UTS gave a talk at Commodore Hotel at a URG meeting 3 Feb and 29 Sept 2015, and Dave had given several URG presentations over the preceding years. John pushed the agenda with URG, and Kris with her IT skills has moved the photo ID project forward. The "citizen science" program has developed well in 2015 and we hope it will continue.

2. Key personnel

UTS: Professor David Booth
Dr Selma Klanten

URG: John Turnbull
Kris O'Keefe

3. Funding applied for

a. Singapore Aquarium (unsuccessful)
b. SIMS (Funding provided from SHRP)
c. NSW Environmental Trust (unsuccessful)
d. Sea World (pending)
e. Australian Geographic (pending)

4. Field surveys done

Dive Site	Unique Number of Weedy Seadragon Dives	Tissue samples (DNA)
Bass Point (Shell Harbour)	1	1
Hole in the Wall (North Avalon)	1	1
North Bondi Reef	1	1
North Head	1	
Red Indian	1	
Abotts Retreat	2	
Blue Fish Point	3	2
North Bondi (Bondi)	3	3
Bare Island	5	2
Henrys Head	11	4
Magic Point	11	3
The Leap	12	3
The Monument	13	5
The Gap	14	5
The Steps	28	4

In addition: Eden 10 samples and Guerilla Bay (Batemans Bay) 1 sample (total 45).

5. Genetics sampling

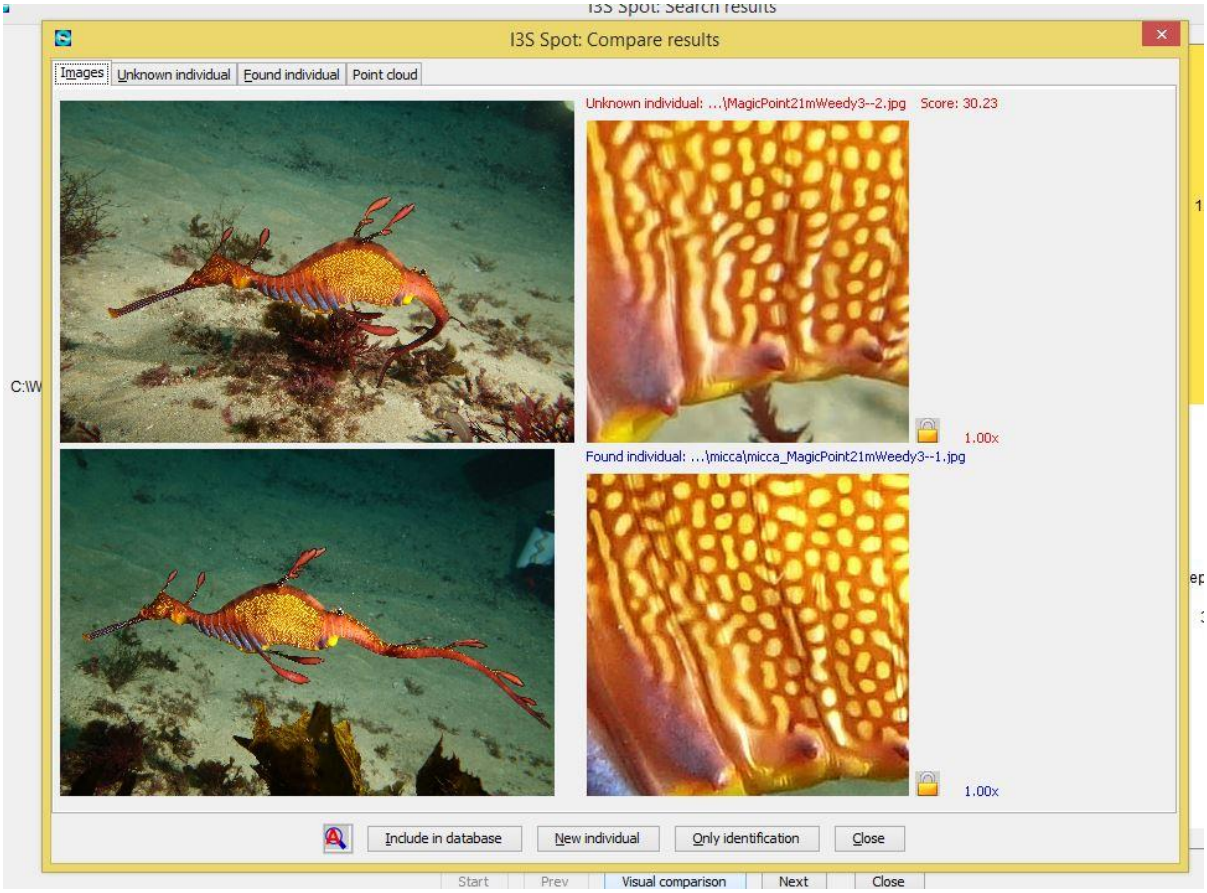
URG has participated in sample collection (fin clips) of dragons around Sydney to complement those collected in Eden, as part of a dragon population genetics study. DNA has been extracted for 36 samples and 17 samples have been successfully PCR amplified for 2 loci (cytochrome oxidase I and control region). These preliminary results (COI and CR) suggest very low genetic diversity, however until more samples are sequenced these results are inconclusive.
The future plan (depending on funding) is to sequence the remaining samples with the addition of cytochrome *b*. This will give us 3 markers (mtDNA) and should be a publication in Conservation Biology/Genetics.
Note: we will make a case that this species is endemic and rare (?) and collection is therefore difficult.

6. Photo ID project

A key part of the ecological study is to monitor demographics, like growth, survival and movement. These are best determined by a long term tagging project. UTS had previously used a physical tagging procedure (elastomer fluorescent implants) but a newer method involving using flank photos to identify and track individual dragons is now being used. Based on an earlier paper by Keith Martin-Smith, Kris O'Keefe is leading this sub project.

Kris O'Keeffe, a URG diver and technical specialist, has been working on flank pattern matching program (I3S) to track our Weedy Sea Dragons and today 2015-12-6 has a workable photo library with 373 individual animal "fingerprints" and 140 unique individuals. The database is mostly comprised of data from 2015 but also includes information abstracted from general underwater photographer historical photo collections going back to 2008.

Finger print
The image above is an example of a 'finger print' file created for one Weedy. This is used for checking against existing database finger print entries and gets imported into the database for future match attempts for any new finger print files.



Pattern matching example

The "Pattern matching example" image above (click to enlarge) is an example of a search result in the database where the top weedy is matched with a database entry for Weedy called 'Micca'.

The I3s pattern matching software is nicely documented in the following site

http://www.reijns.com/i3s/

7. Links

a. Abyss Diving Kogarah have a long history of interest in dragons, and are currently collaborating on the photo ID project.

b. Eden/Merimbula: Merimbula divers Lodge, lead by Rob McKinnon of NPWS.

8. Recommendations

a. Improved survey methods:

Estimating area covered: Suggestion that divers use swim time as a standard way to compute area searched. Swim time needs to be calibrated. Suggestion we use a measure tape and time to swim the measure tape to calibrate remaining dive time. The area covered will likely be a transect. The width of the transect will need to be estimated per dive. eg. 2 divers side by side in good visibility; 15 m coverage etc. 100m dive reels are also commonly used by some URG divers to navigate their way around boat sites so potentially could also be used as a measure. The measure tape might be an easier standard to using reels to avoid potential tangle type issue/risk with reels for less experienced divers.

Pick same starting point (gps or marker) so we have good overlap % for each repeat survey.

b. Genetics sampling

c. Scientific and other outputs

- After sites have been returned to and resurveyed in 2016, we will be in a position to draft a publication on basic demography) persistence, movement, spatial abundance patterns) around Sydney. A key thing is the need for accurate density and location estimates, see above.
- Genetics results should be publishable
- Pending grant success, we intend ot expand across the dragons range…. More paper potential here
- Popular articles and other media (e.g., upcoming small article Jestar Inflite Magazine Jan 2016)

d. 2016 program

- continue at least one dedicated dive per month
- new sites: fin clips where possible, as well as counts and photos

Thanks for all your support and Happy Xmas/New Year!!