



# Science Communication Major for BAppSci

A model for collaborative delivery

The three majors...

BAppSci (Animal Management and Welfare)

BAppSci (Biodiversity Management)

BAppSci (Science Communication)

# Biodiversity Management major: Pathway in Biosecurity

- Courses within the degree can be chosen to provide a biosecurity 'minor'
- Ecological Evaluation and Management
- Concepts in Biodiversity
- Geographic Information Systems (GIS)
- Applied GIS
- Practicum
- Negotiated Study
- Ecological Risk and its Mitigation
- Biosecurity



Unitec Herbarium

## Recognising the importance of taxonomy

Insect Collection



# Undergraduate research

## Modelling the invasive risk potential of Northern Pacific sea star (*Asterias amurensis*) in New Zealand.

Jett Blake.

### Introduction

The Northern Pacific sea star (*Asterias amurensis*) is a highly invasive coastal marine organism listed by the Invasive Species Specialist Group (ISSG) as one of the "100 worst alien invasive species" (Lowe *et al* 2000), due to it being a highly adaptive species, with a wide range of tolerance. This sea star has become invasive in Australia in two areas- Port Phillip Bay, Melbourne and the Derwent Estuary in Tasmania (Biosecurity NZ 2003). In Australia, *A. amurensis* has further contributed to the decline of the endangered spotted handfish (NIMPIS 2008) as it also preys on egg masses and competes for food resources. Literature search suggests that there would be multiple impacts if the Northern Pacific sea star were to become established in New Zealand, especially on the 589 endemic bivalve species (Hutson *et al* 2005).



### Aims/objectives.

The objectives of this project were to:

- To identify the most probable pathways and points of entry into New Zealand, its potential of becoming established and categorize high- low risk areas of the New Zealand coast where it would likely to become established through GIS modelling.
- To assess the potential impacts of this species on the coastal marine environment.

### Methodology

1. Geographic modelling was used to create a suitability model for *A. amurensis* by applying the species ecophysiological requirements directly to New Zealand's marine environment data.
2. By identifying suitable requirements for this species such as depth, substrate, tidal movement and sea surface temperature (SST) together, an overall suitability map was created. Pathways for potential invasion were also mapped.
3. Using existing marine environments classification (MEC) data, areas of conservation importance which would be at risk such as marine parks and reserves were also identified.

### Results

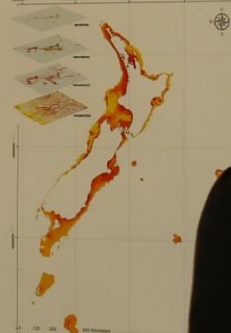
Map 1: Pathways for the Northern Pacific sea star to be introduced into New Zealand Waters based on Actual International Vessel Arrivals.



Map 2: Marine Parks and Reserves at Risk of *A. amurensis* invasion.



Map 3: Suitability of Overall New Zealand Marine Conditions Including Depth, Substrate, Tidal currents and SST.



The resulting models showed that within New Zealand marine environments there are available climatic and habitat conditions (depth, substrate types, tidal movement and SST) considered suitable for potential establishment of the Northern Pacific sea star. The potential areas are in close proximity to major ports of Auckland and Christchurch, (the main pathway of introduction) increasing the risk of invasion. Most of the marine parks and reserves, which exist mainly along coastal areas fall within these potential high risk areas. As of yet research shows that an *A. amurensis* larval introduction has not yet occurred in New Zealand waters, but it remains a constant threat at the borders.

### Conclusion

*Asterias amurensis* poses a significant threat to New Zealand's coastal marine species assemblages as the risk of invasion increases as ship movement and global trade multiplies. As this sea star has become a threat even in its native range of Japan and up to 100 million individuals are present in invaded parts of Australia (NIMPIS 2008), Biosecurity measures and risk management strategies such as ballast water management are being enforced to prevent an introduction to New Zealand to protect native marine biodiversity.

### Acknowledgements

Glenn Aguilar for his GIS critique, support and input, also Rowena Gilchrist and Janine Martin. Graham Jones for draft critiquing, Alana McCartney and Sarah Lealand of NABIS for providing valuable New Zealand marine environment data. Thank you all.

### References

- 1. Lowe, S. J., Brown, M., Buisson, S. (2000) 100 of the world's worst alien invasive species. IAC/IADG Invasive Species Specialist Group (ISSG). International Centre for the Conservation of Marine (ICCM) Marine Reserves. Also invasive species in the marine environment. IACN Science Series 2000. National Science Foundation for the Northern Pacific, and the American University, Washington, DC, USA.
- 2. Hutson, A., Ross, S., Jones, A., Hines, J. (2005) Invasive species do not recognize the biological province of the Pacific Ocean.

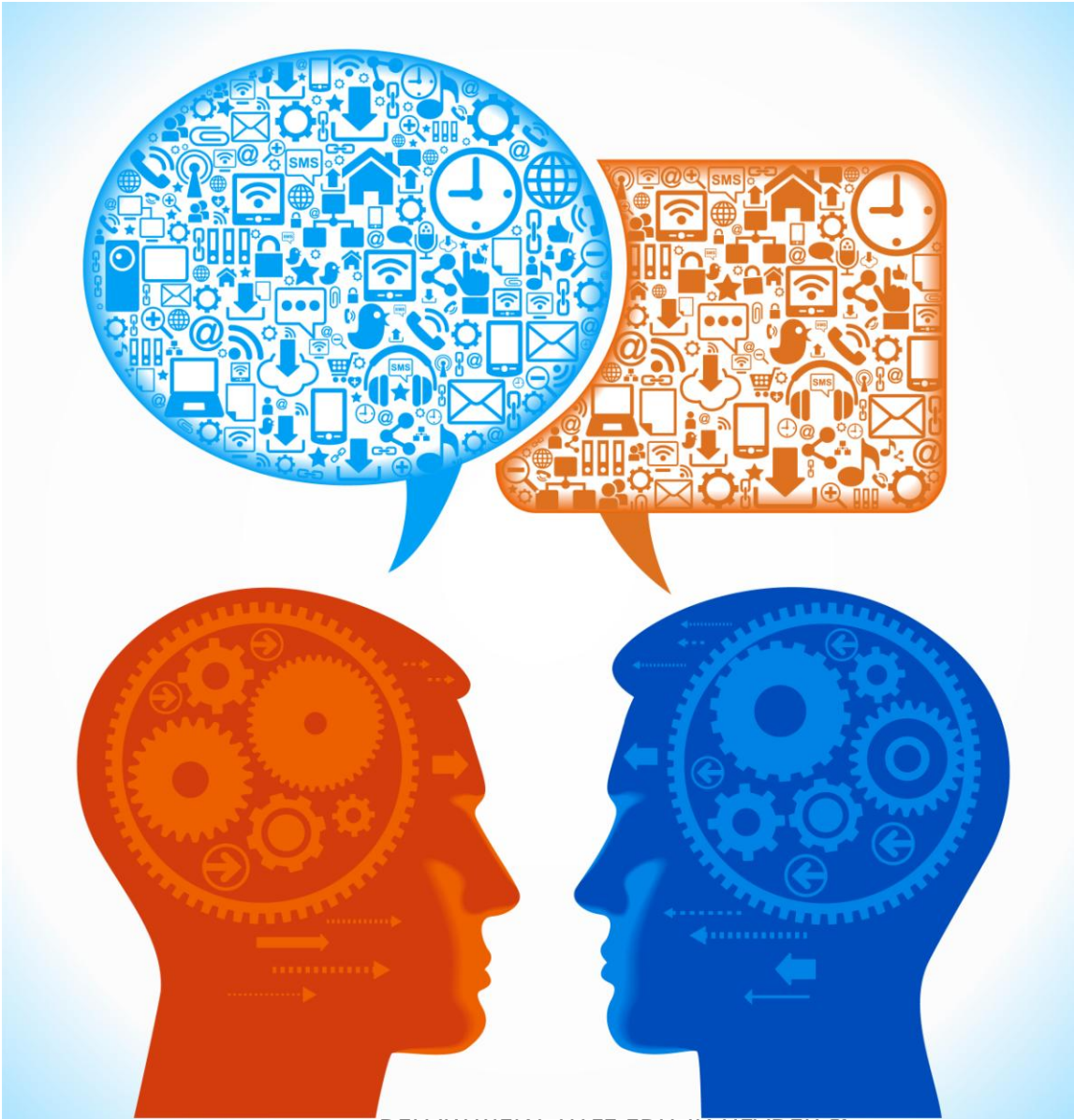




Graduates with biosecurity background are well received in the industry – whether pest management or border security.

>>DEPARTMENT TITLE EDIT IN HEADER &  
FOOTER

# Science Communication



BAppSci (Science Communication)

Common level 5 (year 1) followed by  
specialisation in years 2 and 3



# Year 2: Level 6

Courses	Science Communication		
			<b>COMM 6533 (Sem 1)</b>
Companion Animal Behaviour			<b>Technology and Media Communication</b>
Vertebrate Physiology			<b>PASA 6811 (Sem 1)</b>
Concepts in Biodiversity	C		<b>Emerging Media Innovation Lab</b>
Behavioural Ecology			<b>PASA 6901 (Sem 1)</b>
Practicum	C		<b>Audience Context and Interpretation</b>
Research Methods	C		<b>PASA 6231 (Sem 1)</b>
Animal Health and Welfare			<b>Acting for Non-Actors</b>
Animal Breeding and Nutrition			<b>PASA 6232 (Sem 1)</b>
Ecological Evaluation and Management			<b>The Confident Presenter</b>
Ecological Risk and its Mitigation			<b>COMM 6537 (Sem 2)</b>
Captive Wild Animal Husbandry			<b>News Writing for the Media</b>
Geographic Information Systems			<b>PASA 6311 (TBA)</b>
Media production elective 1	C		<b>Introduction to Digital Screen Technologies</b>
Media production elective 2	C		

# Year 3: Level 7

Courses	Science Communication	Biodiversity	Animal Management
Management and Veterinary Science			
Advanced field surveying of NZ biota			
Captive Wild Animal Population Management			
Measuring behaviour			
Negotiated Study	C		
Global issues in Animal Welfare Science			
Disease Ecology			
Restoration Ecology			
Media Production elective 1*	C		
Media Production elective 2*	C		
Biosecurity			
Applied Geographic Information Systems			
Field trip			
Conservation Biology		C	

COMM 7544  
(TBA)

Communication  
Production Project

PASA 7391  
(Sem 1)

Documentary Research  
and History

PASA 7811  
(Sem 1)

Entertainment Lab for  
the Very Small Screen

PASA 7311  
(TBA)

Advanced Digital Screen  
Technologies

## **Producing graduates who have:**

- Applied knowledge in biodiversity and biosecurity
- Highly developed skills in modern communication technology

You are important stakeholders in this endeavour.  
Your feedback and opinions are an important part of  
our developing graduates who are fit for purpose.

Questions?

