Honours Opportunities

Environmental and Conservation Sciences

Project title	Description	Supervisor contact	Start date
Comparison of the abundance of fishes, phyllosoma larvae and plastics in the surface waters of the SE Indian Ocean	This project will examine a set of samples collected using a neuston net and a standard Indian Ocean net along the 110°E line of the International Indian Ocean Expedition using standard microscope techniques. The results will then be analysed relative to prevailing ocean currents and water masses and the ability of the organisms to undertake diel vertical migration. Interests in deep sea fishes, zooplankton, biological oceanography and being involved in an international science programme are necessary. This project will be co-supervised by Dr Pilar Olivar of CSIC in Barcelona, Spain and Prof. Andrew Jeffs of Auckland University, New Zealand.	Professor Lynnath Beckley	This project is available from Feb 2022.
Trophodynamics of mesopelagic fishes in the SE Indian Ocean	Mesopelagic fishes such as lantern fishes are vital components of the pelagic food web but relatively little is known about their feeding. This project will examine the diet of lantern fishes along the 110°E line of the International Indian Ocean Expedition using standard microscope techniques. The results will then be compared against those obtained by isotopic and genomic techniques (Beckley et al. in prep). Interests in deep sea fishes, zooplankton, biological oceanography and being involved in an international science programme are necessary. This project will be co-supervised by Dr Pilar Olivar of CSIC in Barcelona.	Professor Lynnath Beckley	This project is available from Feb 2022.
Changes in distribution and abundance of pteropods in the SE Indian Ocean	Because of their calcium carbonate shells, pteropods are extremely important sentinel species with respect to extent of ocean acidification. An opportunity exists to compare distribution and abundance of pteropods collected along 110°E during 2019 using an Indian Ocean standard net as part of the Second International Indian Ocean Expedition against published data from the first Expedition at the same stations in 1963. Interests in zooplankton, biological oceanography and being involved in an international science programme are necessary	Professor Lynnath Beckley	This project is available from Feb 2022.
Comparison of the influence of oceanographic variables on larval fishes and krill offshore of Ningaloo Reef	A neat data set from concurrent sampling of larval fishes (meroplanktonic), krill (holoplanktonic) and a suite of marine environmental variables has been collected for several transects offshore of Ningaloo Reef. These data are available to be analysed to test hypotheses about planktonic larval duration and the influence of oceanographic variables. An interest in biological oceanography is essential and the project will be co-supervised by Dr Alicia Sutton of Carijoa Consulting	Professor Lynnath Beckley	This project is available from Feb 2022.

Biological oceanography of the Kimberley	A detailed sampling programme in the Kimberley collected a suite of zooplankton samples together with data on various oceanographic variables (Beckley et al. 2019). These samples are available to explore distribution and abundance patterns of various zooplankton taxa relative to the gradients of major environmental variables (turbidity, chlorophyll etc) in the dynamic, macro-tidal waters of the Kimberley. An interest in biological oceanography is essential and the project will be co-supervised by Dr Alicia Sutton of Carijoa Consulting	Professor Lynnath Beckley	This project is available from Feb 2022.
Role of submerged plants in wetland biodiversity: developing knowledge to underpin wetland restoration	This project follows on from a recent BSc. Honours project examining whether native and exotic submerged plants support different freshwater invertebrate assemblages in wetlands. That project showed that both native and exotic submerged plants increase invertebrate biodiversity in wetlands. This new project focuses on investigating whether the physical structure that plants provide is their most important role in increasing invertebrate biodiversity. A field experiment will place plastic aquarium plants that mimic the shape of common plant species (plant analogues) into local wetlands and observe their colonization by invertebrates. Real plants will also be sampled to identify what species live on the real plants in the same wetland. By comparing the analogues to the natural plants, we will be able to see whether structure alone is driving the positive effect of plants on invertebrate diversity. Mixed plant stands can also be compared, and the diversity and abundance of algal epiphytes can also be examined as they are an important food source. Exotic and native plants can also be compared. This is a field and lab-based experimental project suitable for 1 or 2 students. Co-supervised by Dr Jane Chambers.	Assoc. Professor Belinda Robson	Available February or mid-year start.
Urban ecology of dragonflies	South West WA has more than 40 species of dragonflies, including many endemic species. Around half of these species were found in urban wetlands and streams in the past. However, land use intensification and climate change have altered urban habitats, but the impacts on dragonfly breeding are unknown. This project will involve sampling urban wetlands for dragonfly larvae and exuviae to identify which species are breeding and determine habitat correlates for successful breeding in urban wetlands. Students may also explore whether some species are accelerating their development to make use of seasonal wetlands before they dry out. This project will use field and lab skills and is suitable for 1 or 2 students. Co-supervised by Dr Edwin Chester.	Assoc. Professor Belinda Robson	Available for mid-year start.
The contribution of waterfalls to regional freshwater biodiversity in a flat landscape	South-western Australia is described as being part of the southern Australian flatlands bioregion. Flat landscapes have fewer waterfalls and fast-flowing riffles in their rivers than do mountainous regions. This can increase the importance of waterfalls for providing fast-flowing habitat. Research in another flat region, western Victoria, showed that waterfalls contained unique species of invertebrates not found elsewhere in rivers. Elsewhere in the world, specialised dragonflies, mayflies and stoneflies have been found living only in waterfalls. Southwestern Australian waterfalls have not yet been examined but may also contain unique species. As our climate dries, waterfalls will be very vulnerable to lower flows and shorter flow periods. They may require special management if they are to retain unique species, but the first step is to determine whether waterfalls do contain species not found elsewhere in the	Assoc. Professor Belinda Robson	Best suited for mid-year start.

	landscape. This project involves fieldwork suited to a single or pair of students. A good level of physical fitness is required for this project, as reaching some waterfalls will require hiking and carrying field equipment. Co-supervised by Dr Edwin Chester.		
Do stream confluences provide a unique form of habitat for stream biota?	Understanding longitudinal changes in assemblages of freshwater plants and animals has a long history in the field of freshwater ecology. River flow dynamics change along a hierarchy of spatial scales along the length of a river and are often associated with changes in biotic assemblages. There are several important morphological elements that can cause a sharp change in the flow dynamics along the length of a stream, including tributary confluences (i.e. point where two streams meet). The aim of this project is to assess the importance of river confluences for structuring invertebrate or benthic algal assemblages in small streams in southern Australia, comparing streams in Victoria and Western Australia. Invertebrates or algae will be sampled above and below tributary confluences in both States. This project involves fieldwork suited to a single or pair of students. A good level of physical fitness is required for this project, as reaching some confluences will require hiking and carrying field equipment. The student(s) may also have the opportunity to travel to Deakin University in Victoria for field and laboratory work for a period of a few weeks. This project is co-supervised by Dr Ty Matthews (Deakin University).	Assoc. Professor Belinda Robson	
The role of spiders in controlling mosquitoes emerging from saltmarsh wetlands.	When saltmarsh wetlands are in good condition they are surrounded by fringing trees, including species of Melaleuca, Casuarina and Eucalyptus. This vegetation provides places for web-spinning spiders to build webs and trap flying insects. Anecdotal evidence suggests that where fringing vegetation is removed, more mosquitoes enter nearby residential areas. The aim of this project is to quantify both the density of web-spinning spiders and their diet in saltmarsh wetlands. What vegetation features enhance densities of web-building spiders? This project involves field and lab work and is suited to 1 student. Co-supervised by Dr Edwin Chester.	Assoc. Professor Belinda Robson	This project has a February or mid-year start.
Does the mosquito Aedes camptorhynchus rely on autogeneous egg production to stock egg banks in saltmarsh wetlands?	Recent research suggests that the saltmarsh mosquito A. camptorhynchus may lay an egg batch before taking a blood meal, to ensure that each female contributes at least some eggs to the egg bank. This project will involve field sampling in saltmarsh wetlands in the Peel-Harvey wetlands. The student will collect adult female mosquitoes as they oviposit and determine whether they have taken a blood meal. Adult trapping may also be used. This project involves field and lab work and is suited to 1 student. Co-supervised by Dr Edwin Chester.	Assoc. Professor Belinda Robson	This project has a February or mid-year start.
The flora and fauna of wheatbelt gnammas and climate change	Gnammas are rock pools at the top of the granite inselbergs scattered across the WA wheatbelt. These gnammas have been found to contain rare species of aquatic plants and to have a much higher invertebrate biodiversity than gnammas in other parts of Australia and the rest of the world. Because gnammas are rainfed and unconnected to groundwater, they are unaffected by the salinisation that afflicts much of the wheatbelt, so they may be refuges from salinity. Little is known about the interactions between species in Australian gnammas. Although algae are assumed to provide the base of the food web in gnammas, leaf litter has also been found to be important, but	Assoc. Professor Belinda Robson	Best suited for mid-year start.

	quantities of litter vary dramatically between gnammas in different subregions. Food web structure in gnammas is also poorly understood. These projects will investigate the role of algae and leaf litter in gnamma food webs through sampling gnammas with naturally occurring differences in leaf litter abundance and describing invertebrate food webs and through experimental manipulation of leaf litter abundance. This project only suited is a pair of students, to ensure that you have fieldwork companions, not suited to drought conditions and is co-supervised by Dr Edwin Chester.		
Understanding the path of seagrass seedling success for Amphibolis antarctica and Amphibolis griffithii.	The viviparous Amphibolis plants develop seedlings on the adult plant. The grappling hook at the base of each seedling enables the seedlings to attach to seagrass, seaweeds, or even hessian, while many of the young plants wash up on beaches around Perth. In this project you will be tracking Amphibolis seedlings in the field from the point of release in the meadow to settlement, as well as study seedling movement characteristics in wave and flume tanks. Knowledge around the pathway, and forces needed to keep the seedlings suspended until they find a suitable receptor site will inform seagrass restoration strategies using seedlings in combination with other seagrass planting methods.	Dr. Jennifer Verduin	Semester 1 2022
Artificial seagrass beds to maximise seagrass recruitment	Seagrasses are so-called soft engineers and provide ecosystem services such as wave and current reduction, water clarity improvement, sediment stabilisation and, in effect, providing coastal protection. This project will study the use of artificial seagrass to slow down waterflow and thus preparing the site in the lee of the artificial meadow to form a more quiescent and suitable recruitment area for seagrass seeds and seedlings settlement and to stimulate further seagrass growth. In addition to the artificial seagrass, which will be constructed of biodegradable materials, you will be using innovative nano technology to further promote suitable growth conditions.	Dr. Jennifer Verduin	Semester 1 2022
Climate change projections from the latest CMIP6 models	The Coupled Model Intercomparison Project (CMIP) phase 6 is the latest round of global model projections of future climate change as used by the Intergovernmental Panel on Climate Change (IPCC). A vast family of model simulations exist, from which a number of research questions can be tailored according to the student's interests.	Dr Jatin Kala	Flexible timing
High resolution modelling of extreme weather events affecting southwest Western Australia.	A number of projects can be tailored to better understand different types of extreme weather events to better understand their underlying atmospheric dynamics using high resolution atmospheric model simulations.	Dr Jatin Kala	Flexible timing

Observations and simulations of near surface and subsidence inversions in southwest Western Australia.	Near surface temperature inversions occur typically in the morning after cold cloud-less nights, and this can lead to poor air quality, especially if there were bushfires the day before. Subsidence inversions occur further aloft and can also be conducive to poor air quality. This project will examine the frequency and intensity of these temperature inversion using both observations and models to better understand how these might change in the future.	Dr Jatin Kala	Flexible timing
High value products from saline microalgae.	Freshwater is a finite resource and should not be used solely for human consumption or for agriculture. On the other hand, we need to generate products from marine environment. In this project, the potential of using saline algae as a source of high value product will be assessed. Depending on the interest of the Honours candidate, the project can be designed for: 1. bio-prospecting, 2. mass cultivation and scaling up, 3. harvesting and down-stream processing, 4. process design, 5. techno-economics or 6. Life cycle analyses.	Prof Navid Moheimani	For start from Sem. 2, 2021 onwards.
Milking microalgae for generating hydrocarbon.	There is worldwide interest in developing algal biofuel. One main reason for the lack of success so far in producing a sustainable transport fuel from microalgae is the high cost of biomass processing, especially dewatering and oil extraction. There is also a significant cost involved in the energy content of the nutrient fertilisers required for biomass production. Non-destructive oil extraction or “milking” from algae biomass has the potential to bypass all these hurdles. Using a “milking” strategy means that there would be no need for (a) biomass dewatering, (b) breaking cells for oil extraction and (c) addition of nutrients to the culture, resulting in a significant reduction in energy and fertiliser cost involved in production of biofuel from algae. We make use of the natural tendency of Botryococcus to produce external hydrocarbon in the extracellular matrix. The project can be designed for: a) bioprospecting, b) cultivation or c) c) optimisation of hydrocarbon extraction.	Prof Navid Moheimani	For start from Sem. 2, 2021 onwards.

Light management technologies for increasing algal photobioreactor efficiency.	The ever-increasing demand for food, valuable bio-based compounds and energy has triggered the development of novel and sustainable resources. Microalgae are a promising source of sustainable high-value products. The need for light (suitable intensity and wavelength) and temperature control in microalgal cultures remains the most significant challenge limiting their photosynthetic efficiency and productivity. Appropriate light management has the potential to concurrently maximize photosynthetic productivity and control the temperature of microalgal photobioreactors resulting in a reduction in overall production costs. In this Honours project the candidate will examine suitability of a solar control infrared blocking film (IRF) applied to an algal flat plate photobioreactor to block excessive non-photosynthetic photons and regulate the temperature profile of a selected microalga.	Prof Navid Moheimani	For start from Sem. 2, 2021 onwards.
Algal wastewater treatment.	Due to potential benefits of microalgae production incorporated into waste streams, studies into the use of microalgae culture as a treatment for wastewater have been ongoing for several decades. So far however, results have failed to bring about widespread applications for the industry primarily due to concerns regarding the economic and environmental sustainability associated with pre-treatment or dilution of the waste before growth of microalgae. In this study, the growth of most dominant algal isolates on domestic anaerobic digestate will be assessed. The use of biomass as a source of feed (animal or aquaculture) or bio-fertiliser will also be assessed.	Prof Navid Moheimani	For start from Sem. 2, 2021 onwards.
Spatial ecology and remote sensing.	A variety of project possibilities exist in the fields of spatial ecology or environmental remote sensing, covering topics such as habitat mapping and modelling, spatial planning for ecological connectivity, spatial conservation planning, detection of ecological disturbances and recovery processes, and more.	Dr. Margaret Andrew	Flexible timing.
Environmental policy implementation.	In recent years, MSc students have examined the effectiveness of Australia's implementation of a range of international conventions such as MARPOL, Ramsar Convention and CITES. Projects are available to extend this work to include other international and regional environmental agreements. In addition, the application and implementation of ecologically sustainable development principles within Australian and Western Australian environmental law and decision-making can be studied using a similar framework. Projects of this nature could review the precautionary principle, the use of environmental offsets, etc.	Dr. Oliver Fritsch	Flexible timing.
Public participation and collaboration in managing Swan River.	The participation of citizens, industry, environmental movements and other non-state actors is commonly associated with better environmental policy outputs and a swifter implementation of policies and management plans. Projects are available to analyse the validity of such claims in the context of Swan River. To this end, students will carry out research interviews with policy makers and stakeholders, analyse policy documents and look at a number of other sources. Travel expenses can be covered.	Dr. Oliver Fritsch	Flexible timing.
Environmental Defender's Office of Western Australia.	The EDOWA is an important organisation to offer legal support to citizens and environmental movements in Western Australia. With a small number of staff only and limited resources, EDOWA relies on a network of dedicated environmental lawyers	Dr. Oliver Fritsch	Flexible timing.

	who provide voluntarily and for free legal analyses to win environmental cases. This project takes a novel perspective to look at lawyers as environmental activists. The student will interview EDOWA staff to understand better the conditions under which EDOWA operates and then utilises both research interviews and surveys to explore the wider network of professional lawyers supporting EDOWA. Travel expenses can be covered.		
Sustainability in regulatory impact assessment.	This project will analyse the role of environmental protection and sustainability in Commonwealth and state regulatory impact assessments/statements. Attention: RIA/RIS, not environmental impact assessment (EIA). Large-N and computer-assisted analysis of RIA/RIS documents.	Dr. Oliver Fritsch	Flexible timing.
Relationship between EPA and WA government departments.	This project will explore the day-to-day working relationship between the Environmental Protection Authority and government departments in WA. This includes areas such as environmental impact assessment and environmental regulation. Methods: research interviews with EPA/gov staff, document analysis etc. Travel expenses can be covered.	Dr. Oliver Fritsch	Flexible timing.
Artificial reefs are fish hotels, but is breakfast included?	Artificial reefs are increasingly being used to enhance recreational fishing catches and experience in WA and globally. However, there is still debate as to whether these structures attract or produce fish. This project aims to answer this for Fish Boxes reefs off Mandurah, Bunbury and Dunsborough. It will determine the diets of abundant fish species on the artificial reefs and natural reefs and investigate the food resources on the artificial reef and surrounding sediment. This project will involve boat work several kms offshore, scuba and spearfishing.	Dr James Tweedley	Sem. 1, 2021 with option for some sampling in 2020.
Swimming against the current; fish passage through the Kent Street Weir Fishway.	Kent Street Weir, prevents estuarine water flowing into the Canning River and, in doing so, protects the freshwater environment upstream. As the weir impedes the movement of freshwater and estuarine fish between the waterbodies a fish way was installed. The aim of this project is to determine which species move through the fishway using PIT tags and trapping and then the environmental conditions that facilitate movement. This research, which involves Dept. Of Biodiversity, Conservation & Attractions, will inform the management in fishway and weir in the future.	Dr James Tweedley Dr Steve Beatty	Sem. 1, 2021 with option for some sampling in 2020.
Seagrass as a home for infaunal species.	Seagrasses and other complex habitats are known to support a unique fish assemblage and act as a nursery area. Far fewer studies have, however, investigated the role of seagrasses in supporting invertebrate communities, particularly in estuaries. This study involves sampling vegetated nearby and unvegetated areas of estuaries and comparing the fauna over a number of seasons.	Dr James Tweedley	Flexible.
Is there a lack of nutritional options for crabs in Cockburn Sound?	Work by the Department of Fisheries (DPIRD) and a former Honours student at Murdoch has shown that crabs in Cockburn Sound are undernourished. Crabs typically predate on abundant sources of food lying on or in the sediment. This project will survey the benthic communities of Cockburn Sound and seek to determine what food is potentially on the menu in different seasons and what is its nutritional value. It could	Dr James Tweedley Professor Neil Loneragan	Flexible.

	inform how changes with the management of the harbour will influence the abundance of benthic communities including crabs.		
Urbanisation in estuaries: the good, the bad and the hungry.	As human populations increase the shorelines of estuaries often become modified. Some of these involve the loss of habitat (e.g. converting natural beaches to a sea wall), while others potentially add habitat (e.g. jetties and bridges). This project will quantify how the fish compositions of contrasting natural and anthropogenic habitats differ and estimating the how this affects the carrion consumption. This will involve deploying BRUVs and making zombie fish (see Zombait).	Dr James Tweedley Dr Alan Cottingham	Flexible.
Influence of bar closure and salinity regime on faunal and flora communities on micro-estuaries around Albany.	Estuaries in southern Australia can be disconnected from the ocean by a sandbar and this can have dramatic impact on their communities. This project is part of an existing project looking at how fish communities differ in eight small estuaries around Albany. Given the success of this project and some super interesting results we want to expand the sampling to include invertebrates and macrophytes. Will involve camping if you like.	Dr James Tweedley Professor Neil Loneragan A. Prof. Mike Van Keulen	Sem. 1, 2021 with option for some sampling in 2020.
It's not the size of the animal, but the motion of the ocean; the contrasting size-related life-histories of fauna in macro and microtidal estuaries.	Project will be the first in the world to investigate the size structure of invertebrates in microtidal estuaries. Traditionally there is a highly conservative bimodal pattern of species body size, with large numbers of small species (meiobenthos) and of large species (macrobenthos), with few species of intermediate size. It is hypothesised that this dichotomy in life history adaptations breaks down in microtidal estuaries, which may result in a unimodal species body size distribution as found in freshwater habitats. Involves fieldtrips to a range of estuaries in south-western Australia and South Australia.	Dr James Tweedley	Flexible.
Biology/ecology of fish and invertebrate species in coastal and estuarine systems.	A number of potential projects are available to build on the long-term history of Murdoch's excellence in ecological research on fish and invertebrates. These studies help identify critical habitats for species, understand productivity of our systems and the resilience of these species to anthropogenic effects, particularly fishing.	Professor Neil Loneragan Dr Peter Coulson	Flexible in 2021.
Do sandy sprat (white bait) have separate populations on the west coast of Australia.	Sandy sprat occur along the lower west coast of WA and contribute to commercial fisheries in WA. They are a small species, reaching ~ 100 mm in length and are being managed as a single population or fish stock. Is this the case and may a fishery be possible in Cockburn Sound?	Professor Neil Loneragan Dr Jennifer Chaplin	Flexible in 2021.
What is the significance of seagrass to blue swimmer crabs?	Blue swimmer crabs have an association with seagrass in Cockburn Sound. Is this association significant and does it extend into our estuaries of the Swan and Peel-Harvey? The project involves investigating the abundance of crabs in different habitats and the characteristics of the habitats and associated benthos.	Professor Neil Loneragan Dr James Tweedley	Flexible in 2021.
Understanding ecosystem function in coastal and estuarine environments.	Our coastal and estuarine ecosystems are dynamic systems subject to increasing anthropogenic pressures, particularly near urban population centres. Developing	Professor Neil Loneragan Dr Hector Lozano -Montes (CSIRO)	Flexible in 2021.

	ecosystem models of these systems help understand their function and how they may respond to different pressures.		
Using shell gaping behaviour of Ningaloo Reef Giant Clams to detect environmental perturbations in real time.	Like all coral reefs, Ningaloo is vulnerable to a range of natural and anthropogenic impacts, some of which can cause mass mortality of marine life. Giant clams are the mollusc equivalents of 'charismatic megafauna' and are an excellent flagship taxa to study the effects of environmental perturbations on these communities. This project employs new technology to monitor the behaviour of giant clams at Coral Bay to elucidate the environmental factors that lead to stress in these fragile ecosystems.	Dr Alan Cottingham Dr James Tweedley	Flexible in 2021.
Elucidating the behaviour of bivalves for use as environmental sentinels.	Monitoring the degradation of aquatic environments requires cost-effective approaches. Bivalve molluscs are particularly useful environmental sentinels as they are often sessile or can be contained within a narrow area and respond to stress in a consistent way, i.e. by closing their valves. This study employs innovative technology to monitor the valve activity of several commercially important bivalve species exposed to different environmental and anthropogenic factors, e.g. dissolved oxygen, temperature, salinity and microplastics. This project will provide adequate background for future employment in WA's rapidly growing aquaculture industry.	Dr Alan Cottingham Dr James Tweedley	Flexible in 2021.
Movement and valve behaviour of WA's endemic freshwater mussel.	*Westralunio carteri* (Carter's freshwater mussel) is endemic to south-western Australia and was recently added to Australia's list of threatened species. Like other bivalves, *W. carteri* can close its shell during periods of poor water quality, but differs from marine bivalves in that it is mobile and can also ameliorate stress through moving from those conditions. This study explores the movement patterns and valve behaviour of W. carteri in its natural habitat to establish its physiological thresholds and provide valuable information for the conservation of this vulnerable species	Dr Alan Cottingham Dr Steve Beatty	Flexible in 2021.
Determining the filtration capacity of a 'restored' shellfish reef in WA's most important estuary.	With 85% of shellfish reefs lost, these habitats are among the most threatened marine habitats. Because these reefs provide a range of ecosystem services restoration projects are increasing rapidly throughout the world including in the Swan-Canning Estuary. Although a single mussel can filter nine litres of water per hour, the filtration capacity of a reef largely depends on a large range of abiotic and biotic factors. This study aims to elucidate the factors that influence filtration and estimate the filtration capacity of the reef under a range of different scenarios.	Dr Alan Cottingham Dr James Tweedley	Sem. 1, 2021 with option for some sampling in 2020.
Ecology for conservation.	A variety of research project possibilities exist in the field of plant community ecology and its application to ecological restoration. With my help, students are encouraged to develop projects to address real-world problems. Students can work collaboratively with industry partners including Rangelands Natural Resource Management, Alcoa of Australia or Kings Park Science. Students will be invited to participate in the activities of the Terrestrial Ecology Research Group. Please contact Associate Professor Rachel Standish to register your interest.	A. Prof Rachel Standish	Flexible start date.

Urban ecology.	NatureLink Perth seeks to integrate nature into the city by linking remnant bushlands and wetlands, improving the biodiversity of greenspaces and supporting urban forests. A number of urban greening projects may be available.	Dr Jane Chambers	Flexible start date.
Assisted turtle conservation.	This project seeks to investigate whether collecting eggs of the south western snake necked turtle and incubating them may provide a solution to the declining numbers of juveniles in urban wetlands due to fox and raven predation. More details on application.	Dr Jane Chambers Dr Steve Beatty Anthony Santoro	Mid year start part time recommended.
Monitoring phytoplankton biovolume response to environmental conditions	This Honours project aims to study the overall effect of environmental variables on phytoplankton biovolume in the Swan River Estuary (60 most common species which account for >80% of species detections over the past 10 years). A key component of this study will be assigning each species to a geometric shape and measuring the relevant dimensions of a sufficient number of representative cells to allow biovolume estimation. The student will also need to consider: - Seasonal or other changes in species cell size - Impact of preservation (Lugols) on species cell size - Whether the species can be defined by one size class or needs multiple size class options (e.g. HELCOM biovolume table) - How the gathered biovolume results compare to those used by HELCOM and the Continuous Plankton Counter programs. The project will require significant amounts of time on a microscope, and it would be preferrable to have a student who has some good microscope experience.	A. Prof. Mike van Keulen Prof. Navid Moheimani	Summer paid internship prior to S1 Honours start; must commit to both.
Seagrass restoration.	A series of projects will examine opportunities to improve the succession ecology, and survival and stability of seagrass transplants. The overall aim of these projects is to develop new techniques for effective large-scale seagrass restoration for both temperate and tropical locations. There are various project options under this project umbrella: - Surveys to identify meadows of pioneering species in the Perth region, to act as suitable recipient sites for the study. A variety of habitats will be selected to cover a range of physical conditions. - Studies of seed banks of colonising species will be studied to examine potential for recolonization after disturbance or loss. - Seedlings and sprigs of climax seagrass species will be transplanted into existing meadows of pioneering species; minor/colonising species have been anecdotally observed to aid survival of seagrass transplants and these species will be targeted for this study. - Results will be measured by regular monitoring of experimental plots for survival, growth and physiological stress, and return of ecosystem function. Experimental treatments will cover a range of suitable planting densities and	A. Prof. Mike Van Keulen	Flexible start date.

	will be compared to control plots. The impact of introducing transplants into existing pioneer species meadows will be measured by regular monitoring.		
Changes in community composition of seagrass epiphytes in response to eutrophication.	This project will examine the effects of nutrient enrichment on community composition of epiphytes growing on seagrasses in the Perth metropolitan region. The objectives of this project are: - Artificial seagrass units will be deployed within seagrass meadows to examine epiphyte community composition under natural conditions. - Additional artificial seagrass units will be set up in aquaria at the Algae R&D Centre using seawater collected from coastal seagrass meadows. Some of the lab treatments will receive nutrient enrichment, and some will be controls. - Results will be measured by regular monitoring of epiphyte communities on the artificial seagrass units. Cultured epiphyte communities will be compared to those placed in the marine environment, and to actual seagrass epiphyte populations. Experimental treatments will cover a range of nutrient enrichment levels and will be sampled during 2-3 seasons. - A focus of the study will be the relative proportion of calcareous (climax) epiphyte species vs. filamentous (nuisance/opportunistic) species. - A supplementary/parallel study could be response of epiphyte communities to changes in pH.	A. Prof. Mike Van Keulen	Flexible start date.
Biology and cultivation of Asparagopsis for use as a stock feed supplement	There is considerable interest in the viability of a red alga, Asparagopsis sp., as a supplement to reduce methane emissions in livestock. There are several Honours opportunities to explore the biology and cultivation of Asparagopsis for eventual commercial cultivation. Projects include examination of the biology and life history of Asparagopsis, genetics of secondary metabolite production in Asparagopsis, analytical chemistry of secondary metabolites in Asparagopsis, and onshore and ocean cultivation techniques of Asparagopsis. Students would work alongside industry partners and an industry-funded PhD student.	A. Prof. Mike Van Keulen	Availability is flexible throughout 2021-2023
Alexandrium harmful algal bloom and associated challenges	Harmful algal blooms, or HABs, occur when colonies of algae grow out of control and produce toxic or harmful effects on people, fish, shellfish, marine mammals and birds. The human illnesses caused by HABs, though rare, can be debilitating or even fatal. This project will be focused mostly on the algal species *Alexandrium minutum,* which has been found in the Swan-Canning estuary. *Alexandrium* produce toxins that can be concentrated by filter feeding shellfish. Consumption of shellfish containing high levels of these toxins can result in PSP. In the worst-case scenario, this can cause muscular paralysis and death due to respiratory failure. Various Honours projects on algal cultivation, examination of the biology and life history of *Alexandrium,* as well as	Prof Navid Moheimani	Availability is flexible throughout 2021-2023.

	removal process can be defined. Students would work alongside industry partners and an industry-funded PhD student.		
Determining parental contribution to cultured fish stocks	Yellowtail kingfish is an important cultured fish species in Australia. To supply the local growout industry, fish are naturally spawned in a hatchery in Fremantle. Spawning occurs in broodstock groups (several male and female fish), meaning that parental contribution to the next generation is not precisely known. This limits the efficiency of genetic improvement programs. This project will use an experimental approach to investigate this problem, by creating artificial pools of parental DNA (mixed in different ratios), and genetically comparing these pools with offspring DNA. The project is a collaboration between Murdoch University, the Department of Primary Industries and Regional Development and partners from the aquaculture industry. It would suit a student with interests in molecular biology and population genetics, and a desire to use these skills to help the rapidly growing aquaculture industry in Australia.	Alan Lymbery (a.lymbery@murdoch.edu.au) or Gavin Partridge (Gavin.Partridge@dpird.wa.gov.au)	Available 2021 Semester 1 or Semester 2 start.
Monitoring tools for wary dingoes	Understanding how many dingoes are present in an area is an important piece of information necessary to guide their management. Many studies use passive infrared camera traps to monitor population numbers, assuming that estimates obtained through these cameras are robust and representative of actual numbers. However it is clear that dingoes avoid cameras – some stare into the lens, while others walk around the sensor field and therefore avoid triggering the camera. This project will address a simple question – can we alter camera trap position to increase the likelihood of 'trapping' camera-wary dingoes?	Trish Fleming	Flexible start
What do schoolie ravens eat, and where do they go when term is over?	Australian ravens are problematic for many Perth schoolyards. They are super-smart animals that know how to undo backpack zips, open lunchboxes, and access bins. Their populations flourish around schools as they exploit discarded (or badly protected) play lunches and refuse. But what happens when term is over and students leave for holidays? Anecdotal stories suggest that these bullying birds head out into the neighbourhood where they cause havoc among small bird and reptile populations. This project will use a range of methods to find out what the birds are doing: following ravens using trackers, watching their exploitation of resources within schoolyards, and analysing their diet.	Trish Fleming	Flexible start
Identifying optimal lures for feral cats	Feral cats can be difficult to monitor and control due to neophobia and trap avoidance behaviour, resulting in low detection rates and variable success of control measures. We will test a novel, long-life (up to 1 year) lure system to increase trap captures and reduce neophobic behaviour of cats and develop a smart camera to identify cats.	Trish Fleming	Flexible start
Quenda are fussy about their fungi.	A recent study lead by Murdoch University found that 80% of fungi identified in quenda scats were unclassified on global genetic databases. This indicates that they have never been genetically described before, representing a huge gap in knowledge.	Trish Fleming and Shane Tobe	Flexible start

	This project will compare fungi consumed by quenda with a broader sample collected form the environment to test the hypothesis that quenda are fussy eaters.		
Biodiversity of salt lakes	Salt lakes represent one of the most important inland environments in Australia, yet they are poorly studied. They contain unique and diverse communities of invertebrate. Our research group is studying these invertebrates with the goal of generating base-line information that can be used to help manage salt-lake environments, which are under threat from a range of anthropogenic stressors. We are using molecular tools to review the existing taxonomy of groups, finding new species, documenting the distribution and environmental tolerances of species, and studying population structure, genetic diversity and the evolutionary history of species. We are also testing ecological and evolutionary theories. Join the fun – honours projects on brine shrimp, *Coxiella* gastropods, giant ostracods and other salt-lake taxa are available. Background information - https://www.publish.csiro.au/MF/MF21088	Jennifer Chaplin jchaplin@murdoch.edu.au	Flexible start
Animal Conservation and Population Biology	Many of our Australian native species are found nowhere else in the world, and yet are threatened with extinction. The success of conservation measures depends on having a good understanding of species biology and ecology, but for many species this is lacking. Possible honours projects exist in the study of terrestrial vertebrates, particularly on our native mammals. These studies would examine aspects of population biology and species ecology, including projects collaborating with industry to improve the scientific methods for monitoring these species.	Kate Bryant	Flexible