THE AIM…

Proposed core monitoring activities for CAP Phase II are shown in the central table, listed under the traditional LTER core areas of: primary productivity, populations, human dimensions, climate, watershed biogeochemistry and soils. During the course of the day we hope to establish how these monitored variables will link with research proposed under the five main Integrative Project Areas.

Land Use – Land Cover Change

What are the patterns & drivers of land-use change in PHX?

What are the social-ecological consequences of different trajectories?

The urban fringe/rural interface
Impact of different scales, time lags, character socio-economic), type of development?
Ecological consequences of interface/tension (lags, taxon)
Need monitoring here??

What are the consequences of the temporal/spatial differences?
Between and among evolution/ecology/biology (taxon-specific) and socio-economic processes
Need monitoring here??

Fragmentation –seee populations group
(link with development time trajectory)

Legacy effects
How important are historical imprints v. current use?
Ecosystem memory
Socio-economic factors leading to land-use changes

Mismatch between Cultural/Sociological (faster?) & Ecological (slower?) process rates?
Threshold effects, perturbation, age/lag effects on biota

Biodiversity

I. Diversity and Trophic Structure
What determine them?
How do they differ in urban areas?
methods…
Descriptive & comparative work (local & regional scales)
Manipulative expts (ASU East)
Monitoring

II. Fragmentation
Is urban fragmentation different? Which species are affected?
methods…
species-area relationships
compare urban land cover/patch types with similar sized desert remnants

III. Invasive/Exotic Species
What are the effects on local communities? Which life history features are favored?
methods…
Comparative (life histories).
Expts. (ASU East)
reciprocal transplants (native:non-natives, invasive:non-invasives)
selection experiments

Core Monitoring for CAPII

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Core Monitoring Variables – Current and Proposed

Core Research Areas from CAP I	Primary productivity	Populations	Human Dimensions	Climate & Hydrology	Watershed BGC & Soils
Legend: **Bold indicates variables currently being monitored** *Italics indicate proposed additions* Frequency: * every 5 yrs on survey 200 ⁺ quarterly at pilot PP sites & President's House, DBG, Community Services ∋ bimonthly to quarterly at 200 survey sub-set ⊕continuous at permanent plots	**canopy cover***	**birds∋(@ 50 sites, including 10 riparian)**	**litter, graffiti, disturbance* landscape mgmt (irrigation type & appearance)***	**temperature⊕**	**WMP surface water chemistry (major nutrients & ions) at 5 sites bimonthly**
	plant hgt*	**pitfall traps for ground arthropods∋**	**human activity surveys∋**	**dewpoint ⊕**	**ADP wet & dry dep at 8 sites (major nutrients & ions) monthly/after every rain**
	leaf scale gas exchange⁺	**sweep nets***	**PASS (Harlan)??**	**relative humidity ⊕**	**soil N, C, P concentrations & pools (0-30cm depth)***
	soil respiration rates ⁺	**mycorrhizae* plant sp div.***	**land cover & NDVI via remote sensing (Stefanov)?**	**PAR ⊕**	**soil pH, texture & conductivity***
	shoot extension⁺	**pollen diversity & abundance***	**water inputs to residential landscaping (@ pilot residential sites and Presidents House, monthly)**	**windspeed & direction⊕**	**soil N min (sub-set of 200 survey)**
	chlorophyll content & tree growth (annually @ 50 sites)	*plant ground cover by species in Salt R. riparian corridor (Stromberg)*	*land ownership & land parcel data*	**soil temp & moisture⊕**	**throughfall & runoff chemistry (nutrients & major ions)⁺**
	foliar cover, plant height and canopy cover – especially for Salt R. riparian corridor (Stromberg)	*sweep netting in Salt R. riparian corridor (Stromberg)*	*land & housing values*	**evaporation for Tempe town lake (last 3 yrs) and ASU main campus (since 1982)**	**microbial community composition (Rainey)**
	above ground plant biomass	*light traps, vacuum sampling & Berlese funnels*	*building permitting*	*surface water flow rate and soil moisture (0-30 cm depth) in Salt R. riparian corridor (Stromberg)*	*soil trace gas fluxes NO, NO_2, N_2O, CH_4 (Kaye)*
	below ground biomass/roots/ minirhizotron?	*social insect colony surveys*	*traffic measures (counts, density mapping, travel times)*		*atmospheric CO_2 (Kaye)*
	algal PP in urban lakes	*algae populations in urban lakes herps, fish, mammals*	*sensory surveys (e.g. viewsheds, sound, night-time lights)*		*plant tissue chemistry (Gries)*
			population age, ethnicity		*air pollution monitoring*
			housing density		*nutrient turnover rates (Grimm?, Kinzig?)*
			yard management (fertilization, herbicide & pesticide regimes, pruning frequency)		*nutrient, heavy metals, PAH & VOC build-up on impervious surfaces (Grimm, Shock?)*
					subsurface water chemistry (Grimm?)
					litter decomposition
					household level nutrient budgets (Baker et al)

Urban Contaminants, Ecosystem Processes and Quality of Life

Primary Research Questions:
1) How do contaminants and toxins (in atmosphere, soil, water) vary spatially, temporally, and sociodemographically?
2) What are the effects of peaks, averages, 'pollution hot spots' & transport patterns on quality of life, neighborhood well-being, and ecosystem processes across different temporal and spatial scales?
3) What is the relationship between resident risk perceptions & actual contaminants and pollution loads at the neighborhood scale? [Link to 'Knowledge Exchange']

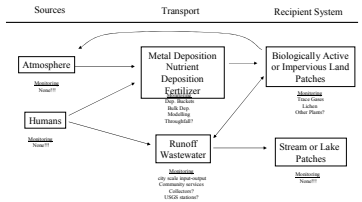
Organizing Themes:
1) Peaks, averages, and the transport of contaminants
Examine acute and chronic concentrations of pollutants
Assess human exposure and ecosystem effects
Focus on air, water, soil and indoor/outdoor
2) Place-based community comparisons
Develop interdisciplinary case studies of **three sites**:
i) urban industrial core (S/SW Phoenix) ii) older but non-industrialized residential area (N Phoenix) iii) developing urban periphery (converted ag or desert area?)
Array sites along a transect from urban core to developing periphery

Targeted Research Projects:
A) Monitor spatiotemporal variability in air pollutants & water contaminants
Develop spatially specific human impacts measures
Link indicators (& contaminant distributions) to neighborhoods sociodemographics
Include other species (e.g. birds) as additional markers of the biological effects
Expand LTER monitoring to include persistent contaminants in targeted areas.
B) Characterizing the Phoenix 'riskscape'
C) Legacy effects of contaminants and toxins:
D) Longitudinal Study of the Emissions Banking program in Maricopa County. Acquire baseline measures of criteria air pollutant concentrations
Monitor sociospatial patterns of participating businesses and local changes
focusing on particulates, sulfur dioxide, carbon monoxide, nitrogen oxides, VOCs

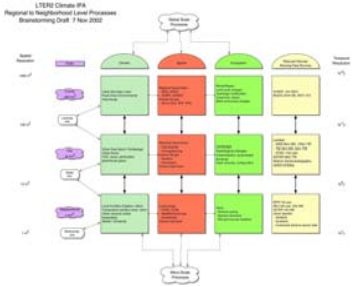
YOUR INSTRUCTIONS…

Please take a few minutes to look at the CAP II research areas you are most interested in & give your comments on where clear links are with the proposed monitoring work OR where monitoring WOULD BE needed.
Use the Post-It notes. Thanks!

Land-Air-Water Linkages in Biogeochemistry



Local Climate & Ecosystem Responses



Water Policy