

FY2015 UAF Research Review

March 9, 2015

*"The University of Alaska inspires learning, and advances and disseminates knowledge through teaching, **research**, and public service, emphasizing the North and its diverse peoples."*

-- Regents' Policy 01.01.01

Research and Development (R&D) and Scholarship to Enhance Alaska's Communities and Economic Growth

-- Shaping Alaska's Future, Theme 4

Research: To Create and Disseminate New Knowledge, Insight, Technology, Artistic and Scholarly Works

-- UAF Accreditation Core theme

Executive Summary

The University of Alaska Fairbanks' (UAF) research enterprise is incredibly financially **productive**, involving nearly a billion dollars spread across 1,500 active multi-year research grants during 2014. A typical UAF research faculty member brings in hundreds of thousands of dollars per year in external research funding, by writing several research grant proposals or contracts per year. This effort is used to answer scientific questions affecting Alaskans and all people, and results in hiring graduate and undergraduate students and research staff, which in turn improves UAF's teaching and service missions.

UAF's productive on-campus research enterprise is enabled by major state investments such as **buildings** and equipment, including the new Margaret Murie Life Sciences Building, and the new Engineering facility under construction. Our complex and interdisciplinary research is made possible by colocated integrated science facilities such as the west ridge complex housing the Geophysical Institute (GI), the International Arctic Research Center (IARC), and much of the Institute of Arctic Biology (IAB).

Data-Driven Recommendations

We recommend applying the UAF **accreditation indicator metrics**, such as research dollars per faculty member, on a more granular per-unit basis to help direct campuswide management and investment decisions.

	Research Unit	External research funding dollars awarded per year per research faculty workload unit	Research grant proposals submitted per year per research faculty workload unit	Proposal funding rate*
Research Institutes	Geophysical Institute (GI)	\$362,000	3.3	37%
	Institute of Arctic Biology (IAB)	\$292,000	3.6	35%
	International Arctic Research Center (IARC)	\$334,000	3.5	44%

Academic Research Units	School of Fisheries and Ocean Sciences (SFOS)	\$940,000	4.1	47%
	College of Engineering and Mines (CEM)	\$788,000	3.9	64%
	College of Natural Science and Mathematics (CNSM)	\$174,000	2.5	40%
	School of Natural Resources and Extension (SNRE)	\$185,000	2.4	57%
	School of Management (SOM)	\$44,000	0.4	100%
	School of Education (SOE)	\$40,000	1.6	100%
	College of Liberal Arts (CLA)	\$28,000	0.5	73%
	Average across reviewed units	\$472,000	3.0	56%
Service Units	Rasmuson Library	\$131,000	6.6	80%
	UA Museum of the North	\$507,000	8.5	100%
Average across reviewed units		\$472,000	3.0	56%

*It is difficult to create a perfectly accurate snapshot of any of these numbers in a given fiscal year. For example, incoming awards and outgoing proposals are lagged by the review period, but we present funding rate here by dividing them.

In the table above, “External research funding **dollars per year per research faculty**” corresponds to UAF’s internal metric used as an indicator for institutional accreditation. Accreditation indicator 10 reads “Average grant or contract research expenditures per faculty member,” and to implement this we recommend counting *awarded* dollars, a leading indicator of quality proposal writing, instead of *expended* dollars, a trailing indicator up to 5 years behind the award. We also recommend counting “research faculty full time equivalent (FTE)” instead of raw faculty headcount, by measuring each faculty member’s proportion of workload assignment to research and creative activity, to more fairly account for tripartite faculty’s proportion of time spent doing research. This does not count research staff, who are a major contributor to productivity, especially in the institutes, but including staff does not affect the overall ranking.

Comparing the on-campus research units using these metrics reveals several surprising facts:

1. Academic research units with vibrant **integrated research institutes**, such as SFOS/Institute of Marine Science (IMS) and CEM/Institute of Northern Engineering (INE), can outperform even the research institutes in terms of per-faculty workload productivity. This validates the tripartite teaching, research, and service mission of the university, and indicates that teaching can actually improve research productivity rather than hindering it.
2. Some units, such as SOM or SOE, do not appear to have a culture of regular widespread proposal writing. The high success rates for the proposals they do submit indicates there is substantial **unrealized funding potential** in those units.
3. This metric can under-count the research activity at academic research units where most organized research happens at a different institute, such as CNSM or CLA, or in fields where research and creative activity can be performed inexpensively.

The 2009 American Reinvestment & Recovery Act (ARRA) resulted in a large jump in UAF research awards, but five years later **federal funding** is steadily shrinking in the current more challenging federal budget climate. Since the bulk of our costs are for labor, this has made it difficult to continue supporting regular full-time research staff. One response is a shift to using term-funded staff to allow the organization to be more agile, and can improve service by allowing people to be moved to positions that fit.

Shared services, such as when a small unit buys business office or travel services from larger unit, have been proposed as a way to save costs. Typically these are not as easy to access as boutique service from dedicated staff, but can be more cost-effective overall. To the extent major service problems exist with shared services, we need to fix those service problems, not abandon the shared service model. This must be coupled with treating indirect cost recovery (ICR) as reflecting the cost of doing additional research, not merely a revenue source for the university.

UAF Research Overview

UAF's major revenue sources are state general funds, federal grants, University of Alaska (UA) receipts, tuition and fees and ICR from sponsored research.

State general fund appropriations made up 41 percent of total revenue in fiscal year (FY)14. However, the state budget challenges are expected to continue as the price of a barrel of oil limits budget flexibility. It is becoming increasingly important for universities in today's higher education environment to have a diversified revenue base. UAF, the state's flagship research institution, does this primarily through externally funded research.

UAF's largest component of federal receipts is in research grants and contracts (64 percent of total federal receipts). UAF remains competitive for key agencies such as the National Science Foundation (NSF), National Oceanic and Atmospheric Administration (NOAA), National Aeronautics and Space Administration (NASA) and Department of Defense (DOD), but is still negatively impacted as a result of lingering effects of federal sequestration and nationwide cuts, demonstrated by the decline in federal receipts of 2.2 percent from FY09-FY14.

Total Value of UAF's Research Portfolio

FY14 reported, from UA in Review:

Total Active Organized Research awards: 969, valued at \$813.8 million

Total Active Other Sponsored Activity awards: 536, valued at \$171.1 million

Total Active Grants: 1,505, valued at \$984.9 million*

*The value is the maximum award amount UAF is authorized to spend over the life of the award.

State general fund does not heavily supplement UAF's research activity. Approximately \$25 million in FY14 was used for unrestricted research expenditures; by leveraging this investment UAF was able to generate an additional \$85 million in restricted research and \$25.4 million in indirect cost recovery. This reflects an average of \$5.50 of total research results for every \$1 of state general fund investment. This is a substantial return on investment.

Research for Alaska

Much of UA's restricted research funding is for research that is directly related to Alaska. In FY14, 82.4 percent of all restricted research expenditures were related to Alaska, with UAF contributing 89.5 percent of all Alaska related restricted research expenditures for the UA System. (UAR Table 5.07 and 5.08)

UA Total Research for FY14: \$120.4 million (UAR definition)

UA Research in Alaska Related Areas: \$99.2 million (82.4 percent of UA Total)

UAF Total: \$106.9 million (88.8 percent of UA total)

UAF Research in Alaska Related Areas: \$88.8 million (83.0 percent of UAF total & 89.5 percent of UA System)

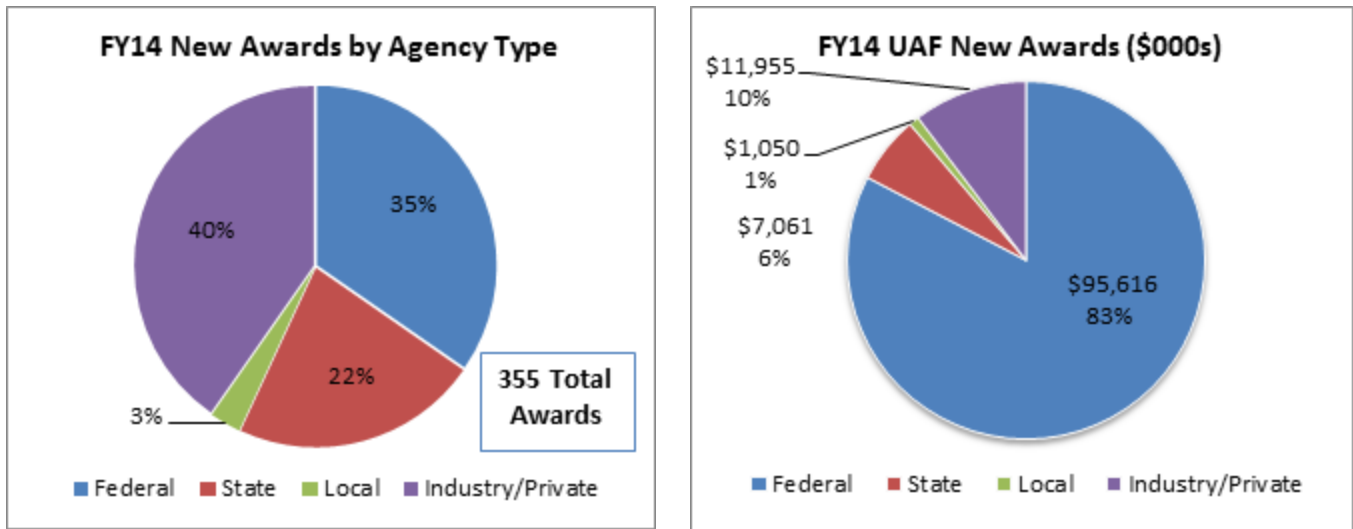
*Per the UA in Review (UAR) research performance definition: these numbers represent research expenditures, including indirect cost recovery (ICR), and not the awarded revenue amount. Grant-funded research expenditures are defined as the amount of grant-funded operating and capital research expenditures, including both direct research expenditures as well as ICR from restricted research grants spent on research and administrative support. This includes externally sponsored research grants booked on the capital budget, a significant portion of which represents State of Alaska funded research.

UAF Grants & Contracts

In FY14, UAF received 355 new awarded proposals, with a total value of \$115.6 million. The majority of the funds (83 percent, or \$95.6 million) come from federal agencies; smaller amounts come from industry or private sources (10 percent, or \$11.9 million), the State of Alaska (6 percent, or \$7.1 million), and local governments (1 percent, or \$1.1 million).

While the vast majority of the award dollars come from federal sources, UAF in fact has received a greater proportion of awards from industry/private sources, representing partnerships (40% of the new awards in FY14 come from industry/private partners).

Charts 1 & 2 – FY14 UAF Snapshot - New Awards by Amount and Type



These numbers represent award value and do not map to revenue or expenditures by source. Some awards may be multi-year. This represents a snapshot for all awards received in FY14 by agency type and total amount.

Indirect Cost Recovery (ICR)

The top programmatic ICR revenue generators at UAF in FY14 were: the Geophysical Institute, School of Fisheries and Ocean Sciences, Institute of Arctic Biology, International Arctic Research Center and the College of Engineering & Mines/Institute of Northern Engineering. Collectively, these units generated 85 percent of UAF’s ICR in FY14. Total indirect cost recovery for UAF in FY14 is \$23 million. A portion of the ICR funds generated by UAF gets distributed to Statewide (12 percent or almost \$3.1 million in FY14). The majority of all ICR at UAF is reinvested in research, with 50 percent returning to the generating unit.

Detailed Evaluation of Research Institutes

Geophysical Institute (GI)

Unit productivity: GI is experiencing a decline in non-state research awards; this has been mitigated some, but not entirely, by an increase in state funding. (Part of the decline in non-state funding was due to loss of DOD grants for Arctic Region Supercomputing Center (ARSC) before ARSC was moved under GI; likewise part of the increased state funding for GI is due to a new allocation of the university’s state general funds to support ARSC). It is likely that state funding will decline in future, so this overall trend is of some concern. Although, per UAF’s Planning, Analysis and Institutional Research (PAIR) data, GI’s proposal rates haven’t declined much, awards have declined, and total award amounts have declined even more. [It should be noted that PAIR reports a FY 14 proposal total of 164, and GI self-reports a FY 14 proposal total of 248.] The research revenue per faculty FTE is very healthy however, despite recent downward trends. The publication rate appears to be okay. Academic year (AY) 2014 scholarly publications totaled 136 and FY 2014 faculty FTE totaled 52.4 – so roughly a 2.5 publication rate for the year [and yes, this ratio inappropriately mixes AY and FY data]. The number of research assistant (RA) students GI supports per faculty FTE is also declining some (which may be related to funding declines). Although clearly there are some downward pressures on GI productivity, the unit is very productive. Within GI, there are some new “venture” type areas, such as the Alaska Center for Unmanned Aircraft Systems Integration (ACUASI), a revamped ARSC, an oil spill response “center” and High-frequency Active Auroral Research Program (HAARP);

it is a good sign that there is continued investment in areas that might become future revenue growth areas, but it is unclear how much support for these units is coming from GI, versus the Vice Chancellor for Research's (VCR) office or UAF central budget.

Cost and efficiency analysis: GI's report notes that the staff/faculty ratio is declining some, and this does seem to be one appropriate metric to monitor for unit efficiency. It is noteworthy that the staff/faculty ratio has declined, even as overall faculty FTE has declined. The report notes a move to shared staff services (such as a common proposal support office) with other research units. Although proposal effort seems steady, award rates have declined. This indicates less efficiency, but it is unclear whether this trend is out of the norm for the new national research funding environment.

Core themes, partnerships, synergies: GI clearly contributes to graduate student education, research, community outreach and engagement. GI is also clearly connected to other UAF units, and national and international partners. The spectrum of GI partnerships seems likely to enhance institutional connections and reputation. The report doesn't outline near-term goals explicitly, but in the "what would be the impact of a budget increase" section discusses some possible future directions. It is not specified in the report to what degree GI is actively pursuing partnerships or leveraging synergies to achieve these possible strategic future directions.

Overall assessment: As noted above, GI is a productive unit. There is a decline in research funding, and declines in FTE and students supported. It seems a positive direction that GI is engaging with other units to explore shared staff services that might reduce individual unit costs. GI is actively engaged in developing new research areas and in engaging with a broad spectrum of partners. It is not clear whether these last activities are resulting in new revenues, higher publication rates, or more student support (GI's stated outcomes metrics – which seem appropriate things to measure).

Research growth opportunities: GI's report clearly identifies several areas as possible growth areas: expanded Alaska Satellite Facility (ASF) contracts, Alaska Center for Unmanned Aircraft Systems Integration contracts, Alaska Regional Super Computer revamp to secure new contracts, acquisition of the High-frequency Active Auroral Research Program facility and possible attendant contracts, EarthScope facilities acquisition to add to existing earthquake monitoring array, expansion of oil spill response research/response capabilities, expanded rocket range usage. All of these identified areas seem appropriate for UAF's long-term goals of deepening capacity in the areas of Arctic research and education, Science, Technology, Engineering and Mathematics (STEM) research and education, and Alaska economic and community development support. There could possibly be an increased emphasis on how the GI could contribute to greater UAF market share in Arctic and Pacific ocean science research (which seems to be a strong area of interest for the Arctic Council nations and observers, and therefore a potential growing revenue area).

Institute of Arctic Biology (IAB)

Unit productivity: IAB lost a few highly productive faculty within this five year window that has contributed to some loss in sponsored awards. This is compounded by the ending of several other large projects that may not have had an option to renew or continue. Faculty are still producing papers and graduating students but the trend is downward and may be something to watch closely in the next few years. As IAB is one of the larger research institutes at UAF, a downward trend in this area may have significant longer term impacts in terms of research projects and partnerships.

Cost and efficiency analysis: There may be some duplication of service within IAB's administrative units than can be consolidated into a singular business hub. IAB noted some developments in this area that may be in early stages of implementation. Citing efficiencies between IAB central and Center for Alaska Native Health Research (CANHR) as "shared services" is somewhat of a misnomer since the CANHR is part of IAB, and may rather represent service consolidation. Shared services may include partnerships with other units (non-IAB) and should additionally be explored. This unit may be at risk as the IAB bottom line budget is reduced and research awards (and ICR) are declining. IAB notes there are some awards where a reduced finance and accounting (F&A) rate is

used - IAB (like any research unit) should work to fully recover the F&A on allowable awards in order to keep the revenue streams as high as possible for research reinvestment within the unit. Start up costs for new faculty may also be something that is a challenge in the future. A reduction in student aid is also something to watch, as increasing costs and decreasing student aid may make it difficult to attract the best faculty and students in future years.

Core themes, partnerships, synergies: IAB's Toolik Field Station does show an increase in productivity as demonstrated in their increasing requests for remote sensing/environmental data requests, steadily over time. IAB's is also the leader within the UA System for the National Institutes of Health (NIH) IDeA Networks of Biomedical Research Excellence (INBRE) program; although this does not recover full F&A, this does allow for investment in biomedical faculty and expertise which should lead to new NIH awards. IAB is the only biological sciences, biomedical or wildlife doctoral-level science research unit in the UA System. IAB/CANHR's research focuses on Alaskan cultural and health related issues, and is of tremendous importance to the state. Focusing on and growing these areas of strength may help IAB weather the shrinking fiscal climate, since these seem to be areas of strategic importance.

Overall assessment: There are some downward trends that can be explained by removal of the Robert G. White Large Animal Research Station (LARS) and loss of key faculty, but may still be of concern. The downward trends of paid undergraduate research students is significant and should be addressed. The graduate students awards are also not well explained and should be explored further, as there may be some funding challenges that can be addressed to help this situation. IAB appears to have 78% of its budget occupied by labor costs, which may be lower on average than other/similar units. If other expense categories are too high that a focus on student compensation or awards is neglected, this may merit a consolidation of other administration within the unit. Grant funding is down from every major agency except Department of Interior and Department of Agriculture. Corporate sponsors appears on the rise. There is something called critical mass for a group and, although IAB is not hovering on that yet, consistent downward trend puts it at risk of a negative feedback loop that will leave the faculty below critical mass.

Research growth opportunities: Veterinary Medicine (Vet Med) and INBRE both represent potential growth opportunities for IAB. The biggest boost to IAB would be new, strong faculty to both teach and bring in grant funding. First would be to ensure the newer, younger faculty is moving toward higher productivity and second would be looking at new hires. The latter requires start up funds as well as initial support that would have to come from both the institute and a college.

International Arctic Research Center (IARC)

Unit productivity: Funding and publication numbers seem relatively constant, which is impressive in this challenging funding environment. There is a \$25M 5-year NOAA Cooperative Institute for Alaska Research (CIFAR) grant in FY13, but it is not clear if this is mostly pass-through money. External funding is \$8-10M/year, fund 1 is \$3.6M/year, a reasonable ratio.

Cost and efficiency analysis: Proposal funding rates improved notably starting in FY13, even though the number of proposals submitted nearly doubled from 40/year to 70/year. IARC is efficient at sharing meeting space, and recommends more sharing of lab space.

Core themes, partnerships, synergies: Extensive partnerships within UAF (GI, INE, IAB), nationwide, and around the globe. Some opportunities may exist for more state-level partnerships.

Overall assessment: IARC is a productive and smooth-running research institution, and seems to have successfully transitioned away from Japanese government funding to a more diverse set of stakeholders.

Research growth opportunities: IARC's student research grant program in the Center for Global Change (CGC) funded 67 students via a competitive internal funding process, which could be a useful model for other institutions on campus.

Detailed Evaluation of Academic Research Units

Institute for Marine Science (IMS) / School of Fisheries and Ocean Science (SFOS)

Unit productivity: Fundamentally SFOS is a unit with low instructional responsibilities (low levels of tuition, only 5-9 graduate teaching assistantships, 18-29 graduate degrees per year school-wide), but with 91-104 total faculty (half tenure-track?), investment in SFOS represents a tremendous opportunity for research productivity and outreach. This opportunity is partially realized with approximately 140 publications per year, and steady success with F&A bearing grants over the last 5 years when competition has increased, especially for federal funds. Graduate student production is low, given the level of research expenditures and number of faculty, compared to other units that practice the integration of research and teaching. Proposal submission rates are dropping both in absolute terms and relative to FTE, which is ominous.

Cost and efficiency analysis: General fund investment in SFOS has increased 12.3% over five years, an enviable situation. It is unclear how administration of the *Sikuliaq* will change these academic trends of peer-reviewed papers, enrollment, degree production, and F&A, though the dollar volume will certainly increase. The number of staff (67) relative to faculty (84) still seems high; perhaps they will be needed to manage the ship? Proposal count is lower in the last year of the five year report, but total "FTE research" is only down by 1 (33 to 31.9), so the decrease is not due to less faculty, as suggested. The ~45% increase in tuition over five years is welcome, given the investment in the undergraduate fisheries program; what is the potential for this growth to continue or even accelerate? The overall amount is \$723K is relatively low, compared to CNSM, at least (~\$2.2M).

Core themes, partnerships, synergies: The geographically distributed nature of the research makes integration with on-campus research challenging, but SFOS does an excellent job of integrating UAF-centric research with the rest of the state, including Anchorage, Juneau, Nome, and smaller stations.

Overall assessment: The *Research Vessel Sikuliaq* operational funding will provide a short-term monetary boon along with a significant management challenge. With the current limited state budget, we expect little further investment through Capital Improvement Plan research, so the long-term survival of SFOS depends on transitioning to a diverse array of competitive funding sources.

Research growth opportunities: SFOS must bring in future dollars via competitive research grant proposals. The incentive for writing proposals fundamentally needs to be internal within faculty, but administrators can heighten it by not providing summer salary (must come from grants), sweetening the pot through ICR return (start with 1-2% if that is all that can be afforded), and showing how ICR now returned is strengthening the program through graduate student, travel, or other support for fixing equipment, etc. in faculty labs, in addition to providing for new hires.

Institute for Northern Engineering (INE) / College of Engineering & Mines (CEM)

Unit productivity: INE is the research institute of the College of Engineering and Mines, and is tasked with developing engineering solutions for energy, natural resources and infrastructure, training future engineers, and diversifying the Alaskan economy. INE is organized around a core research program and five centers; Alaska Center for Energy and Power (ACEP), Alaska University Transportation Center (AUTC), Mineral Industry Research Laboratory (MIRL), Petroleum Development Laboratory (PDL), and Water and Environmental Research Center (WERC). INE has a total of ~\$15M non-fund 1 research activity in FY14 of which ~\$9M is directly associated with these five centers. INE hosted ~25 research faculty FTE, with a total faculty of ~75 in CEM, and thus an effective research FTE of 40 that has remained relatively constant over the reporting period. INE hosts ~34 research staff, and ~17 non-research staff. The number of proposals submitted has remained relatively constant per year at ~140, and the number of awards per year is ~65 with an increase to 86 in FY14. The number of publications has varied from a maximum of ~75 in FY11-FY12 to ~40 in FY13-14. The number of invention disclosures has increased steadily from 1 in FY10 to 21 in FY14. The value of external awards has varied from \$9M to \$25M, with the maximum values (of both the total and the award) associated with the American Recovery

and Reinvestment Act (ARRA) in FY10. The research expenditures have varied between \$14M and \$20M (non-fund 1) and \$3M to \$6M (fund 1), the maximum non-fund 1 expenditures occurring during the ARRA period. The number of graduate students has varied between 46 and 26, and the number of undergraduate students between 31 and 21. Students have received five awards at competitions, and 14 Undergraduate Research and Scholarly Activity (URSA) awards. INE has several areas of activity that are mandated by the state of Alaska and is commissioned and contracted to do research for the State of Alaska directly. INE houses several unique facilities for research.

Cost and efficiency analysis: INE shows relatively high success in grantsmanship, 40%-60% of proposals are awarded. Research productivity per faculty exceeds \$300k/research FTE, and ~1 published paper/FTE. INE notes the diversity of faculty appointments in INE and CEM (primarily research versus departmental tripartite) and the different workloads and levels of research activity. The increase in general funds received, represents increased state investment in ACEP. In ACEP, the center with largest research revenue and most state support, the (fund 1) state investment appears to have yielded an increase in research (non-fund 1) from \$1M to \$4M. In comparison, WERC receives “some fund 1” support and the research revenues have remained constant, while PDL receives no state allocation has had a significant decrease in research revenue in FY14. The number of graduate and undergraduate students has decreased and the number of papers published has decreased. However, if the number of grant proposals submitted and papers are combined then the number of publications peaked during the ARRA period (~140) and has remained steady (~115) over the past three years. The ratio of Non-General Fund to General Fund revenues has fallen, partially due to state investment in ACEP.

Core themes, partnerships, synergies: INE primarily contributes to UAF core themes of Research and Educate. The level of research activity and publication has stayed roughly constant, while the number of invention disclosures has increased. INE is engaged in a variety of UA, State, and federal partnerships. For example, INE leads a new Experimental Program to Stimulate competitive Research (EPSCoR) effort to study wind power with partners at UAF (IAB) and University of Alaska Anchorage (UAA) School of Engineering (SoE) and Institute of Social and Economic Research (ISER).

Overall assessment: INE total research activity (State and Federal) has increased from \$14M in FY10 to \$18M in FY14, while number of research FTEs has remained constant. Grantsmanship remains high with relatively high success. However, the number of students and publications has decreased. However, success in grantsmanship in FY14 is expected to reverse that trend in FY15 and FY16.

Research growth opportunities: Completion of the new engineering building will provide an additional 116,900 square feet of facility space in support of engineering programs at UAF. This represents a significant increase in capacity and opportunity for engineering research in Alaska. The challenge will be to ensure resources for researchers to make the most use of these new facilities (e.g., in-house research initiation funds, student research support, development of research curricula).

College of Natural Sciences and Mathematics (CNSM)

Unit productivity: CNSM shows a positive trend when it comes to proposal counts over time and the award amount in recent years is higher. CNSM seems to have good success rates based on the number of proposals. For a unit with a heavy focus in both instruction and research, CNSM seems to be successful in each, respectively. CNSM indicates the average publication of peer-reviewed papers is one-two papers per faculty per year.

Cost and efficiency analysis: CNSM shows a consistent trend for use of unrestricted (general) funds; any increases over time seem to be shouldered on increasing tuition or restricted funds, which is a good sign. For a college with a primary focus in instruction, building a research unit (CNSM Division of Research) within it may be a duplication of services. CNSM noted if budgets were to be reduced a shift would occur in faculty workload assignments from research to teaching. This indicates that instruction is the core mission and function of the unit. CNSM already partners with GI, IAB, SFOS and INE (75% of the faculty are joint appointments) - each of these institutes may already have research support capacity to assist the CNSM faculty, so CNSM would not have to develop research administration in this area. As only 25% of CNSM faculty might be a 100% appointment within

CNSM (approx. 30 faculty), partnership for research support through the institutes may be a more efficient way to manage these needs in the future (assuming a constricted budget climate).

Core themes, partnerships, synergies: CNSM is currently partnered in many areas as the majority of faculty within the unit are jointly appointed. With new hires in chemistry (to alleviate bottleneck courses), a recent merger in the geography program and the expansion of the Vet Med program, CNSM is making strides to improve a student's progress to degree and create new opportunities for teaching and research. The UAF Vet Med partnership with Colorado State University (CSU) may also be an example of a program that succeeds when two universities partner together to meet state needs.

Overall assessment: CNSM seems to be productive on both the research and teaching side and has demonstrated several examples of growth in positive and strategic ways. Maintaining focus on the teaching core will likely be needed in the future as the fiscal climate may not allow for a robust research arm within this unit, but will be achieved through effective partnerships with the institutes.

Research growth opportunities: CNSM has some opportunity to partner with research institutes, especially as part of the growing Vet Med program. CNSM also notes the increasing opportunities for CNSM undergraduate students to participate in research opportunities. The new NSF funded "Research Experience for Undergraduates" (REU) program is impressive and will provide an additional 56 undergraduate fellowships between FY14-FY18. Expanding this experiential learning will align well with Shaping Alaska's Future and UAF initiatives.

School of Natural Resources and Extension (SNRE)

Unit productivity: The productivity of the unit has decreased markedly, likely a result of the restructuring in 2014 (Scenarios Network for Alaska and Arctic Planning moving to IARC having the largest effect). The trend over the previous 4 years seems stable. Also there are still large discrepancies to the PAIR data. Total publications seem small for a unit of this size.

Cost and efficiency analysis: The cost data are somewhat problematic, a large grant in 2012 raised that year well above the rest. Considering this the remaining years are more stable, yet there is still a decrease in 2014. Still the funds per research FTE are indicative of a strong program, though the FTE numbers are rarely in sync with the data from PAIR, the largest discrepancy in 2014 where PAIR shows 1.8 research FTEs and SNRE declaring 7.6. The number of graduate students using the research facilities seems a little low, about 1 per faculty member over the last 5 years. In spite of the reductions, the publication rates seem stable, suggesting higher productivity by faculty. In total funds should be maintained at a level to ensure qualification for U.S. Department of Agriculture grants.

Core themes, partnerships, synergies: SNRE fits well to some of the core themes with the exception of "Prepare" which would seem to be key here as most of the research has direct application to Alaska and its industry. In the introduction there was consideration of the needs of the state and preparing students for jobs, but it fell short in this section. The synergies here are strong, likely this section was simply not complete, or student success rates post-graduation are not sufficiently tracked.

Overall assessment: Overall SNRE seems fairly well positioned after what must have been a difficult time. This has necessitated increases in individual productivity. This should lead to gradual sustainable growth.

Research growth opportunities: Continued partnerships across the UA system would be strategically wise, like the one with UAA at the Palmer Facility.

School of Management (SOM)

Unit productivity: There has been an improvement in research productivity, though the levels are far below what could be sustainable, even for a unit that does not have a strong research focus. Total publications seem small for a unit of this size, and citations or h-index are also poor.

Cost and efficiency analysis: The school seems to rely on tuition mostly, and support over investments. It is unclear if this is cost-efficient, but the trend seems to be going down with the focus on teaching and not building a stronger research component. Yes, the enrollment is up, but tuition cannot cover the whole costs.

Core themes, partnerships, synergies: There does appear to be significant competition between schools in the UA system, within UAF SOM appears to provide many needed services.

Overall assessment: The loss of tenure lines to term faculty will limit research. Overall, the school looks to be struggling with the research aspect of the work.

Research growth opportunities: New centers like the Center for the Study of Security, Hazards, Response, and Preparedness (C-SSHRP) and partnering with active research programs to utilize business-savvy approaches to maximize return on research dollars and partner with larger funding opportunities, such as insurance markets, to support research. We encourage the school to broaden grant activity beyond C-SSHRP as well.

School of Education (SOE)

Unit productivity: Most of the existing grants listed have either already expired or are expiring in 2015. The one notable exception is the NSF award to principal investigator (PI) Kaden that is through 2017. Overall unit productivity is low because research awards are dependent on one or two specific PIs. SOE publishes approximately one peer-reviewed paper per year per faculty, on average.

Cost and efficiency analysis: The proposal trend is in the negative direction with a steady decrease to zero in the last two years. However, the trend for the ratio of non-state revenue to state revenue has been positive for the last two years, while state funding remained more or less flat. Both FY13 and FY14 showed a significant increase in F&A from the previous year, consistent with increased funding. The ratio of faculty to staff is about 2:1 in either FTE or headcount, with both faculty and staff predominantly Fund 1 supported. SOE appears to be managing within their budget and relies mostly on unrestricted (general fund) and tuition sources, which matches an overall focus on instruction.

Core themes, partnerships, synergies: SOE is aligned with Prepare and Education themes, which is also aligned with SOE's mission and objectives. Much SOE research is focused on student preparedness related to cultural issues.

Overall assessment: This is primarily an academic unit focused in instructional areas. Looking at growth of degrees over the past five years, SOE is making progress. In a research context the strong dependency on one or two faculty members puts SOE at risk. The loss or retirement of either of these faculty could entirely eliminate these award dollars.

Research growth opportunities: 1) Partnerships - Agencies like NSF are currently focused on award opportunities with specific areas where "broader impacts" or "intellectual merit" are included; this means SOE may be able to partner with other research institutes to research activity. Collaborate proposals such as with the Center for Arctic Sustainable Development (CASD) are examples where SOE faculty could get involved. 2) Growth opportunity exists if the PIs were to include more RAs on grants proposals. This will additionally expand graduate research opportunities and would cover the cost of tuition for the students. This would also generate more ICR for the unit and institution. 3) Give hiring preference to new faculty that have research experience or funding may also expand the number of possible PIs within the unit over time.

College of Liberal Arts (CLA)

Unit productivity, Cost and efficiency analysis: Restricted research faculty FTEs are declining, faculty workloads are declining, and unrestricted research faculty FTEs are relatively stable. Is CLA losing faculty for whom research is a priority to one of the institutes? CLA's proposal count is relatively consistent during the period FY10-FY14 and they are submitting proposals in all three categories (<\$100K, \$100K-\$250K, and >\$250K). However, funding awards are down nearly 82% during the period FY10-FY14. It's unclear whether this is related to the nearly 50% decrease in restricted faculty FTEs during the same period. Curiously, restricted staff FTEs rose 200% during the period. Are these staff members, for example, research professionals supporting the relatively stable restricted research expenditures during FY10-FY14? Scholarship/fellowship expenditures rose 990% during FY10-FY14, reflected primarily in a jump from \$2.5M in FY13 to \$118.7M in FY14. No explanation given. CLA's faculty and staff unrestricted headcount has remained stable during the period FY10-FY14.

Core themes, synergies: The report did not articulate clear core themes or synergies beyond listing four departments (psychology, Alaska Native Language Center, Center for Cross Cultural Studies, and CLA Division of Research).

Partnerships: CLA appears to have a history of partnerships and/or relationships with local, regional, and state entities that may have the potential for recruitment of students, collaborative research programs, scholarships, etc., but the report did not make such outcomes explicit for the partnerships listed. Of the 25 partnerships listed, the dates given for 10 partnerships are outside of FY10-FY14. A partnership of note was the Journalism Department's program that places students in media outlets. CLA's report did not indicate the number of students participating, length of participation, number of students placed, number who secured post-education employment – all metrics that would appear to be valuable and possibly demonstrate workforce development, community engagement, and student support. Bristol Bay Native Association partnership noted only that it was “research” and research assistants were hired. The report was not clear whether the assistants are/were UAF students, staff, faculty, etc.

Overall assessment: CLA's funded research activities have historically occurred in only two departments: psychology and anthropology. This year, psychology ran their grants through IAB, resulting in a rather precipitous decline.

Research growth opportunities: The college would be stronger if funded research were more broadly based in a variety of departments. Not only could this help the college and university funding situation, it could energize the faculty and help integrate the college into the research on campus.

UA Museum of the North

Unit productivity: The UAF museum is unique in having a tripartite mission including research, with 9 faculty curators and 2.15 research FTE. Research grants are primarily small, under \$100K, and long duration, but are written regularly and have an excellent success rate, and are awarded at about \$1M per year. The museum should be commended for rapidly digitizing their tens of thousands of new collection items per year, and adding nearly 20,000 digital images per year. Their faculty publication productivity of 40-50 papers per year is also excellent.

Cost and efficiency analysis: The museum's overall budget is about \$4.5 million, but admissions and sales cover half of this, research grants cover about half of the remainder, and state support is steady at about \$1.6 million.

Core themes, partnerships, synergies: The museum does an excellent job of outreach, reaching busloads of people every day in the summer, and acting as an anchor destination on campus for a variety of visitors. It has close on-campus partnerships with UAF Anthropology, Biology & Wildlife, and a number of other campus units. The museum is not only involved to curate collections from those departments, but to actively assist in their scientific analysis, such as via their ancient DNA, molecular genetics, and imaging laboratories.

Overall assessment: The museum is surprisingly successful both at their core curation mission and at securing external funding for their scientific research.

Research growth opportunities: The museum's proven track record of securing external funding with their very small research staff argues for investment in additional research faculty lines.

Rasmuson Library

Unit productivity:

- 1) **Research:** Library faculty (range 9 to 12 FTE over the FY09 to FY14 study period) show no research FTE component yet regularly produce a solid 1 to 3 proposals per year per faculty member. Awards have ranged between 1 and 16 over the study period, with FY14 presenting 16 awards, clearly an outlier in recent output. Award levels and research expenditures appear to trend inline with the number of awards, although ICR generation does not. ICR generation has significantly spiked in FY14, very likely related to the spike in FY14 awards. The unit typically supports at least one funded graduate position (either research assistant (RA) or teaching assistant (TA)) per year, and as many as three positions were funded during the study period.
- 2) **Support:** The Rasmuson Library is truly a comprehensive, multi-faceted research library that services a wide swath of topics from the physical, life, and computational sciences to social sciences, education, business, and humanities. Keeping pace of the rapidly changing technology environment that defines library information services today, the unit's electronic book collection and other electronic resource services are growing while

traditional, paper-based volumes are reaching a plateau, if not a possible decline. The unit specifically cites an increase in reference desk transaction activity pointed towards helping patrons navigate the expanding electronic library collections.

Cost and efficiency analysis:

- 1) **Research:** The Rasmuson Library pulls no general fund in direct support of its research activity, relying solely on non-general fund opportunities. Given the Library's stated mission, it appears that direct research effort is not a central focus, and so the lack of general fund in direct support of Library research makes sense. Still, as far as small research units go, the Library produces a fair number of proposals (range 3 to 10 over the FY09-FY14 period) and receives at least one award per year. Moreover, it appears that as the number of proposals submitted increases, so goes the number of awards and the amount of research expenditures. It is hard to assess the research efficiency of a unit that draws no support for its direct research effort in the context of the several units that do. Though budgets are tight, it may be strategic to invest general fund research dollars into the Library to develop the unit's research activity. Such an approach, however, would likely require the modification of the unit's mission.
- 2) **Support:** *Collect support* expenditures have declined over the study period from \$1.2M in FY11 down to a mere \$158K in FY14, while *ongoing resource purchase* expenditures have increased from \$54K in FY10 to nearly \$2M in FY14. The unit's analysis states that, "each year, the cost of online subscriptions increase 10 percent," or roughly \$300K per year, in support of online databases and print materials. While print materials are on the decline, the number of database searches increased tremendously from 649,357 searches in FY13 to a little over 2 million in FY14. While it is difficult to assess the efficiency of these resource expenditures in relation to outputs gained, the strategic shift from paper-based resources to electronic resources appears to conform with patron demand.

Core themes, partnerships, synergies: The Rasmuson Library upholds its mission as a research library that seeks to support a comprehensive national university with a large research enterprise. The unit documents its relationships with other UA libraries in broad support of the UA mission by extending library services and its unique resources throughout the UA system. Internal and external partnerships appear adequate, with implementation of *ScholarWorks@UA* being a noteworthy highlight.

Overall assessment: The Rasmuson Library appears to be highly focused on its research support mission, as stated. Though a small research unit, the library regularly submits proposals and receives awards for research, suggesting that further development of its direct research activity may be warranted, if such activity supports its mission and does not negatively impact research support services. Partnerships and system-level synergies appear to be genuine and constructive towards the support of the university mission. Expenditures and investments in library resources appear to be inline with changing patron preference for electronic resources and new technologies in online information research.

Research growth opportunities: There may be opportunity for expanding research activity at the Rasmuson Library through the direct investment of general fund research dollars. Such an investment may require a review of the unit mission. Exploration with library faculty may reveal new opportunities in non-general fund research revenue and should be considered.

Detailed Evaluation of Research Support Units

Animal Resources Center (ARC)

Unit productivity: The count of researchers using ARC facilities is rising, currently at 23, five of whom were external to UAF. It is not clear from the report which animal populations are being used in research – and whether the cost of maintaining these animals is calculated by animal type. The number of animals kept is decreasing slowly, which may be appropriate given low recharge revenue signaling low researcher interest.

Cost and efficiency analysis: The center's total budget is about \$1.3 million, \$0.9 million of which is payroll for the staff FTE of 15. Less than \$0.2 million is recharged back to researchers, a surprisingly low ratio; and a surprisingly

high \$0.25 million is generated from tours and sales of products such as qiviut (musk ox wool). ARC indicates that it plans to fill a newly consolidated education & outreach coordinator position in 2015, presumably in an attempt to further enhance revenues. UAF's ARC is clearly largely funded with state general funds; unlike other research units, as ARC does not secure external funding on its own, it is unclear whether the state funds invested in this center are generating a return. It might be helpful for the next iteration of this review to attempt to ascertain what level of funding the researchers using ARC animals have been able to secure.

Core themes, partnerships, synergies: A number of UAF units do animal research, but not via ARC, which indicates there is opportunity to provide more animal services on campus. In general it appears that the units that report to the Vice Chancellor for Research have transferred animal care to ARC, but that the units that report to the Provost have not. It might be appropriate, in this time of constricting resources for the ARC Director and the VCR to discuss shared services with the Provost and the directors of the other units that provide animal care. The vast prevalence of "Don't know" responses to the survey indicate that many units at UAF do not engage in animal research or do not have good connections to ARC. A refinement to the survey for next round, might be to include the question "Does your unit currently conduct animal research, or does it plan to do so in the future?" and then leave out responses from units that do not/will not have interactions with ARC.

Overall assessment: After the tragic LARS Musk Ox deaths in 2010-2011, UAF's animal care was reviewed by both internal and external experts, and reorganized with the creation of ARC so the attending veterinarian has direct oversight of animal care at ARC facilities. This division of duties may prevent a conflict of interest between animal care and other operational needs, but it also means that animals are maintained without any weighing as to whether this program remains a UAF research priority. The VCR will need tools to assess what level of investment is appropriate for this service. Although ARC is moving to increase revenue from outreach activities, it would seem more important to establish whether and where animals are needed for research purposes. In addition, the ARC Director will need mechanisms to make sure the needs of researchers and their units are met.

Research growth opportunities: ARC has a unique opportunity to help researchers at UAF and beyond understand our unique plants and animals. Given 1.5 of the ARC FTE hold doctorates, there may be opportunities for some collaboration with research units in at least conceptualizing research opportunities. The launch of the Veterinary Medicine program may provide additional opportunities to better utilize the animal assets maintained by ARC.

Office of Intellectual Property and Commercialization (OIPC)

Unit productivity: OIPC is a service/support unit that focuses on identifying and promoting UAF faculty, staff and student inventions, patents and licenses where viable business demand may exist. This is a relatively new area that is emerging. Thus far OIPC has shown measurable growth in invention reporting, licensed technologies, patent applications and patents granted. It is difficult to tell what the "normal" level of productivity will be for this office as it may not be sustainable to grow exponentially over a longer time period.

Cost and efficiency analysis: Start up funds (both unrestricted/strategic investments and restricted/Foundation funds) have initially been provided by the office of the chancellor, but as the office develops, it is likely to be self-sustaining. OIPC is doing an excellent job reporting with clear metrics in comparison to research peers, which helps UAF better tell its' "research story" to external and industry partners. It is unclear how ICR flows to OIPC; more explanation in this area may be helpful.

Core themes, partnerships, synergies: OIPC partners with the Nanook Innovation Corp (NIC) to communicate and market material efficiently; as budget conditions are expected to shrink, choosing the best/most optimal information to communicate will be critical. OIPC is building partnerships with the Office of Grants and Contracts, Office of Research Integrity and Office of Proposal Development at UAF - these partnerships, as developed, will help solidify the OIPC pipeline for potential technologies that may benefit from OIPC services.

Overall assessment: Per the customer survey, research customers who use OIPC like OIPC services. Customers feel like OIPC is currently slightly more important than effective, but both scores are relatively high. The unit is maturing, so responses tend to indicate either that some units do not use OIPC services at all, or for those that do use the services, response is relatively timely and effective. It may not yet be a high-use unit on a repeat basis. To

date, they are providing good advice and are building relationships that will likely carry them forward in the future for increased exposure/awareness and success.

Research growth opportunities: Currently OIPC is building a pipeline of patent requests; as only some of these will be successfully granted, focusing on those with the best potential for award may be an area to emphasize in the future. Once a normal/sustainable volume is known, setting sustainable targets may be something to consider.

Office of Research Integrity (ORI)

Unit productivity: ORI's productivity measures include administering three mandated compliance committees, outreach and education, and compliance/violation review. Results from a survey conducted this fall asked respondents "how important" and "how effective" ORI is in regards to these three areas. Of the 11 responding units, most answers indicated ORI had a better-than-average level of importance and effectiveness. ORI indicated a survey asking more detailed questions would be useful, which seems an appropriate course of action.

Cost and efficiency analysis: ORI operates solely on Fund 1. ORI's annual budget and the total cost/expense of personnel during FY10-FY14 declined overall, although variations occurred throughout the period. ORI states that baseline costs for research compliance remains constant regardless of funding levels.

Core themes, partnerships, synergies: No other unit provides the services of ORI. ORI notes partnering with eight other administrative units on campus, but the nature/benefit/outcome of those relationships is unclear.

Overall assessment: ORI states their committee services are federally mandated for animal and human research and as such are critical to UAF's research enterprise. Other than a survey, no other metrics were reported by which to assess this unit. Regularly repeated, more detailed, and anonymous customer surveys might offer useful metrics by which to make more informative future assessments.

Research growth opportunities: ORI notes that greater research funding/expenditures, which results in increased Fund 1 through indirect cost recovery, would enable their unit to acquire advanced compliance tools and improve staff training. Improved communication with researchers has the potential to improve research proposals and the resulting funding/expenditures.

Process for Next Review Cycle

The committee feels it is valuable to collate metrics on every research unit every year, because a unit's data collection skills tend to atrophy over the longer multi-year cycles used by accreditation and academic program review. It has been valuable for the committee to review every research unit for the past two years, but for future years we could likely provide more valuable in-depth analysis if we restrict our focus to the few units that our initial metrics indicate are 'at risk' due to low or dropping proposal counts or award rates.

Our proposal for the next review cycle is:

- October: PAIR collects FY2015 metrics. The committee uses this data to determine a few (3-5) at-risk units to request more detailed reports, modeled after this year's report request sent to all units.
- December: unit reports back from deans/directors, sent out to committee.
- January: committee prepares reviews for at-risk units.
- February: finished reviews sent back to deans/directors and to VCR.

To ask at-risk research unit directors next year:

- How have charges shifted between external research dollars and state support? Are our state dollars acting as strategic investments in growth areas, or life support?
- How are you utilizing new investments, such as new buildings or facilities?
- If we format the PAIR data like the UAF accreditation metrics, for which areas are you on mission? For the areas where the unit is not performing to accreditation metrics, why not?

As a way to broaden the committee's representation of on-campus units, we recommend including the faculty senate Research Advisory Committee membership in the research review committee.

Research Review Committee Membership, 2014-2015

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