Planetary Science R&A Program Update

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Committee on the Review of NASA's Planetary Science Division's

Restructured Research and Analysis Programs

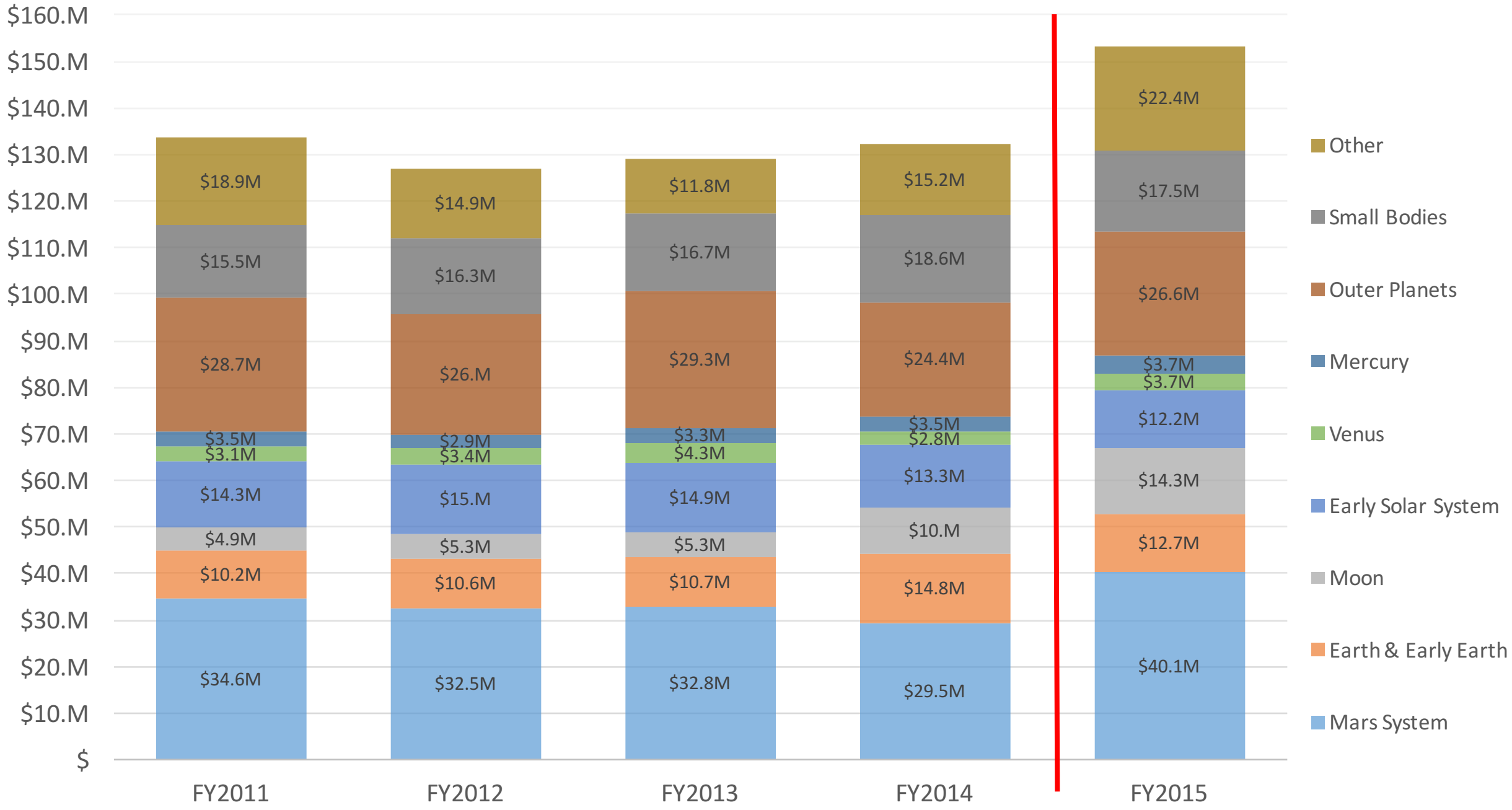
August 17, 2016

Funding for NASA-related research and development projects is a privilege afforded to qualified science, engineering, and educational personnel by NASA acting on behalf of the citizens of the United States through Congressional and Executive action

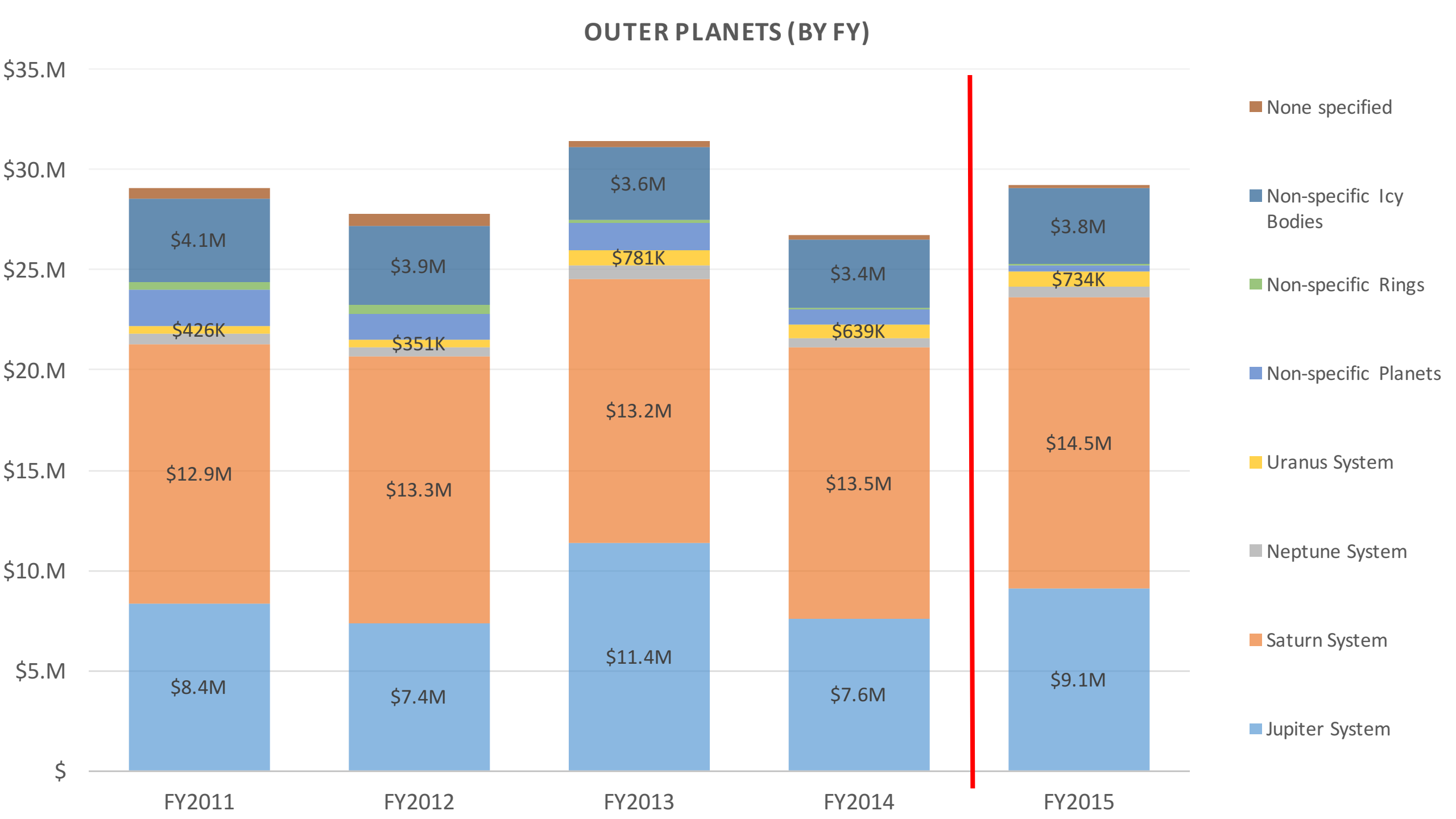
NASA's proposal and selection procedures work only because the various research communities and NASA Program Offices together maintain the highest level of integrity at all stages of the process. (Guidebook for proposers)

- We did the R&A restructuring to enhance transparency to our stakeholders in the Administration and Congress
- The charge to the committee is to evaluate whether the new structure encompasses the range and scope of activities needed to support the NASA Strategic Objective for Planetary Science and are the elements appropriately structured to develop the broad base of knowledge and broad range of activities needed both to enable new spaceflight missions and to interpret and maximize the scientific return from existing mission

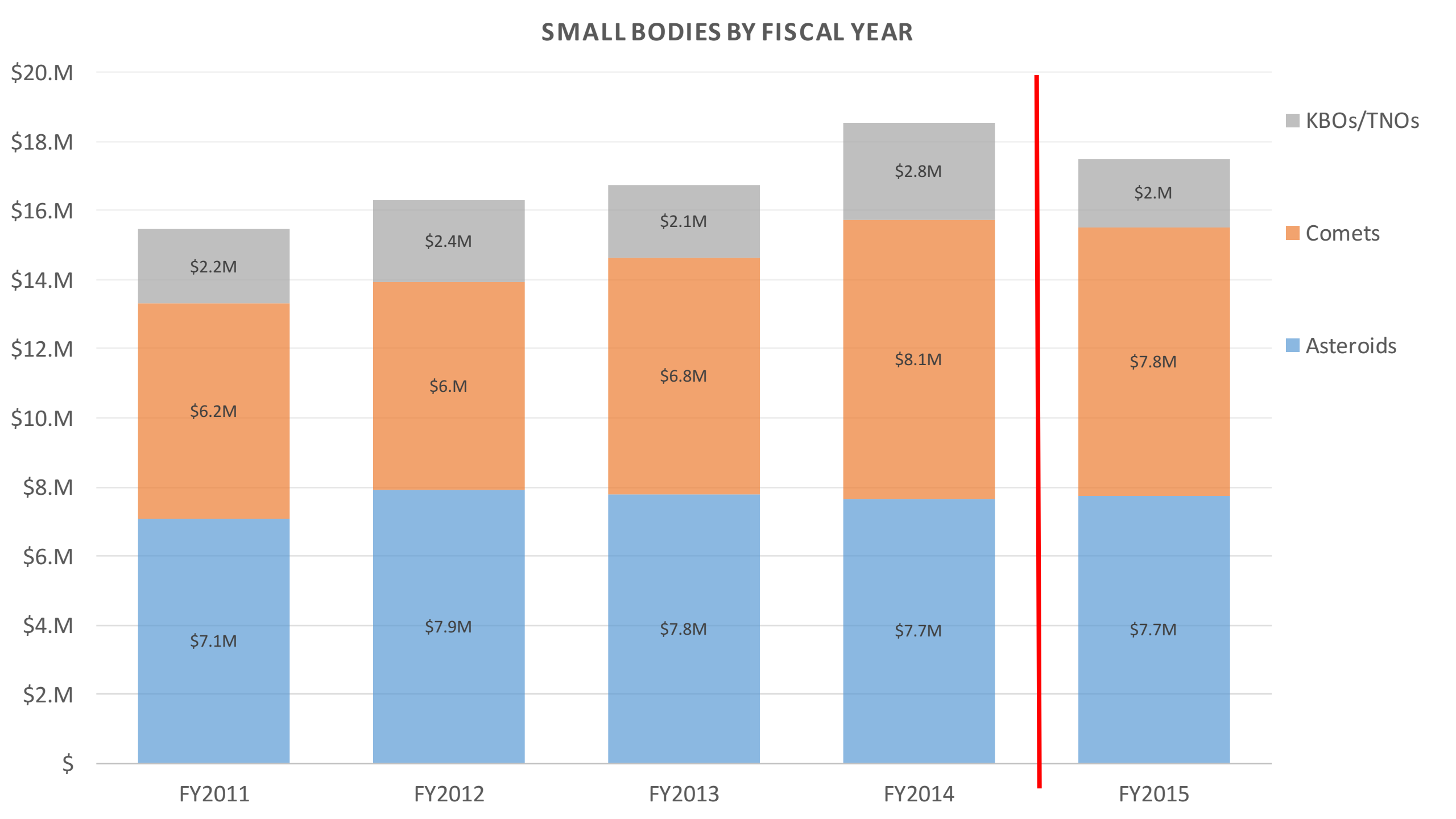
R&A INVESTMENT – TARGET OBJECT OVERVIEW



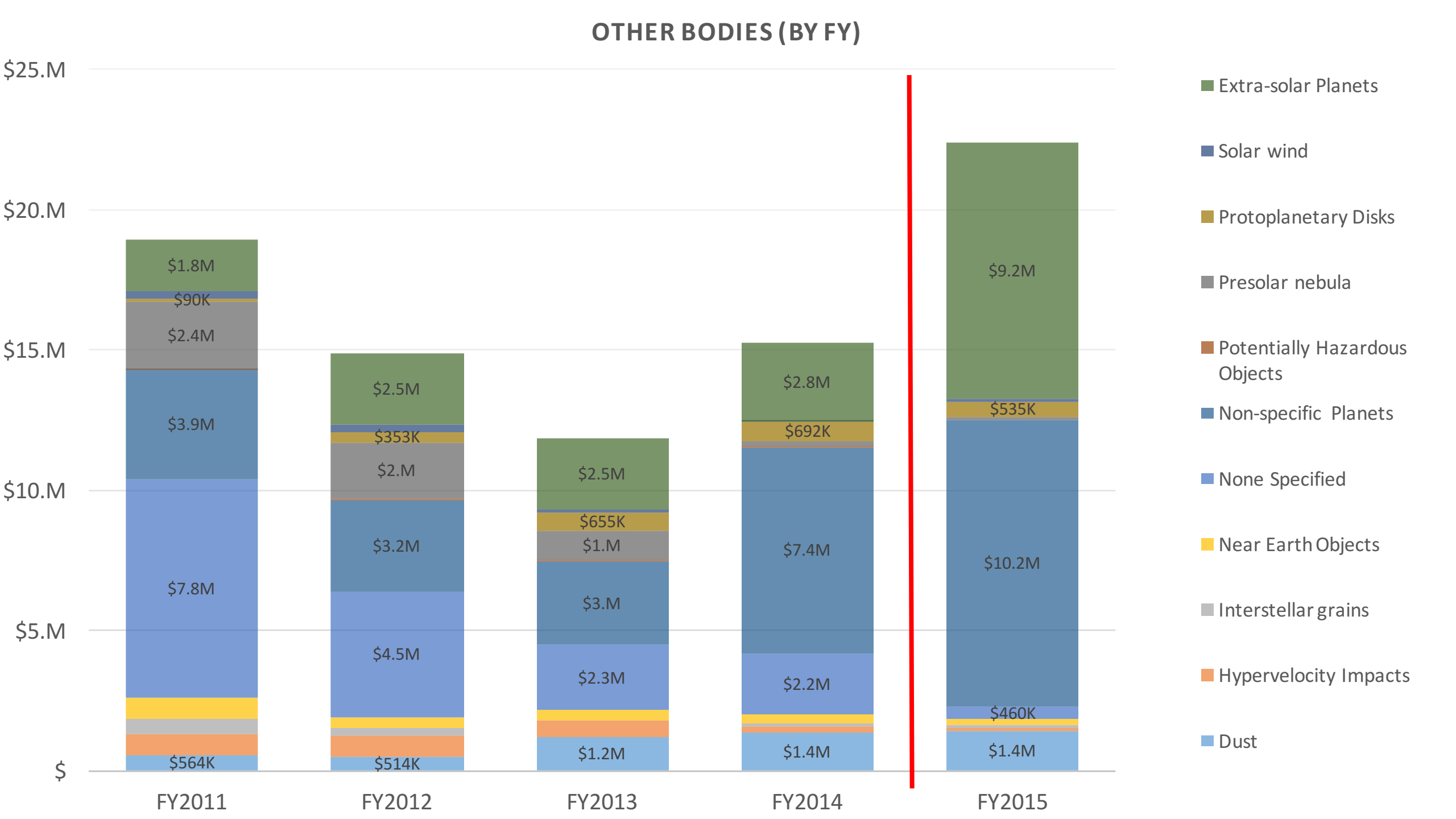
Keyword – Target Object, General	FY2011	FY2012	FY2013	FY2014	FY2015
Mars System	$34.6M	$32.5M	$32.8M	$29.5M	$40.1M
Earth & Early Earth	$10.2M	$10.6M	$10.7M	$14.8M	$12.7M
Moon	$4.9M	$5.3M	$5.3M	$10.M	$14.3M
Early Solar System	$14.3M	$15.M	$14.9M	$13.3M	$12.2M
Venus	$3.1M	$3.4M	$4.3M	$2.8M	$3.7M
Mercury	$3.5M	$2.9M	$3.3M	$3.5M	$3.7M
Outer Planets	$28.7M	$26.M	$29.3M	$24.4M	$26.6M
Small Bodies	$15.5M	$16.3M	$16.7M	$18.6M	$17.5M
Other	$18.9M	$14.9M	$11.8M	$15.2M	$22.4M


OUTER PLANETS (BY FY)
$35.M
$30.M
$25.M
$20.M
$15.M
$10.M
$5.M
$
FY2011
FY2012
FY2013
FY2014
FY2015
$4.1M
$426K
$12.9M
$8.4M
$3.9M
$351K
$13.3M
$7.4M
$3.6M
$781K
$13.2M
$11.4M
$3.4M
$639K
$13.5M
$7.6M
$3.8M
$734K
$14.5M
$9.1M
None specified
Non-specific Icy Bodies
Non-specific Rings
Non-specific Planets
Uranus System
Neptune System
Saturn System
Jupiter System

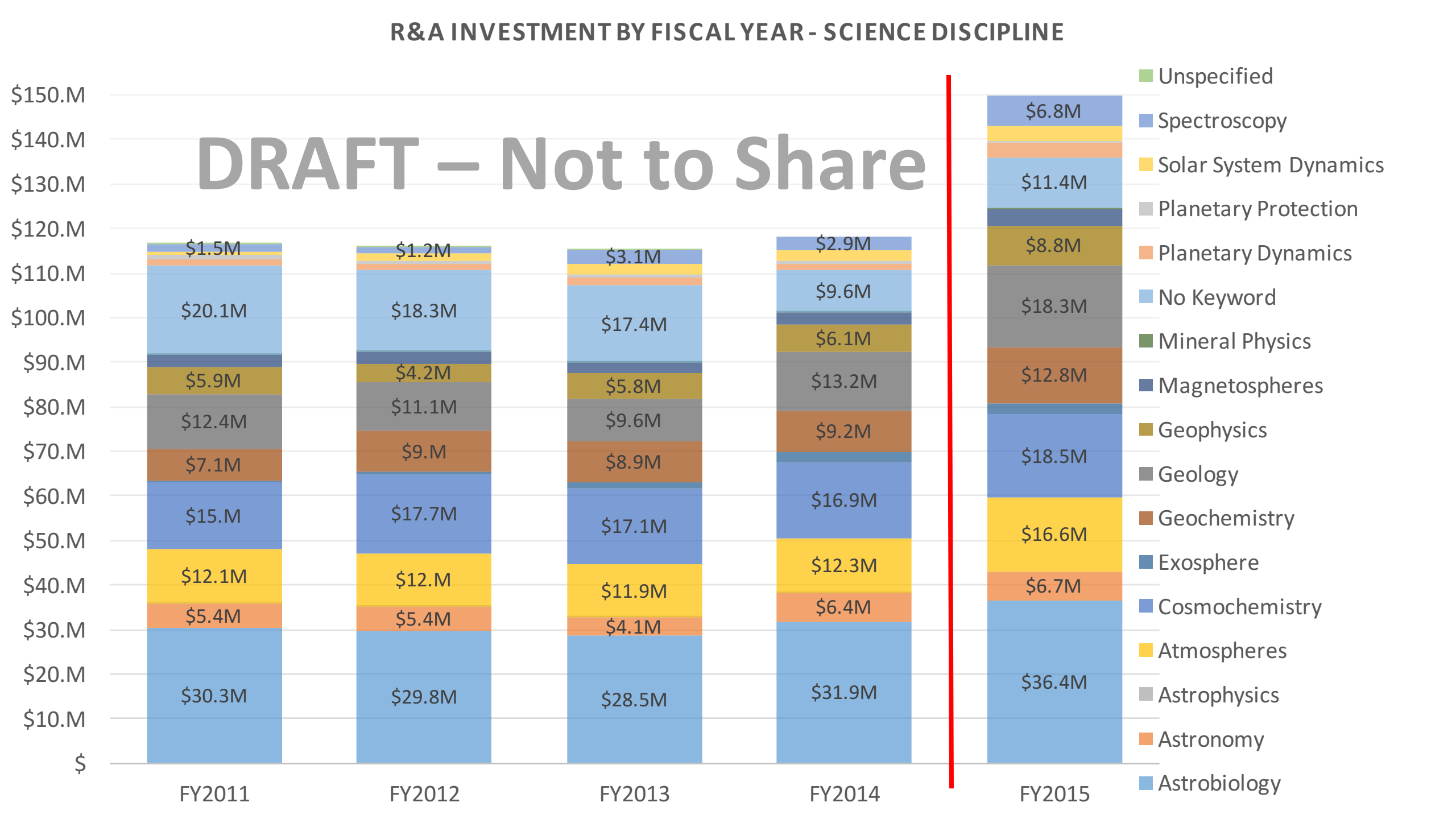
Keyword – Target Body, Outer Planets	FY2011	FY2012	FY2013	FY2014	FY2015
Jupiter System	$8.4M	$7.4M	$11.4M	$7.6M	$9.1M
Saturn System	$12.9M	$13.3M	$13.2M	$13.5M	$14.5M
Neptune System	$521K	$450K	$673K	$523K	$528K
Uranus System	$426K	$351K	$781K	$639K	$734K
Non-specific Planets	$1.8M	$1.3M	$1.3M	$796K	$355K
Non-specific Rings	$378K	$400K	$169K	$48K	$26K
Non-specific Icy Bodies	$4.1M	$3.9M	$3.6M	$3.4M	$3.8M
None specified	$501K	$652K	$340K	$202K	$147K


SMALL BODIES BY FISCAL YEAR
$20.M
$18.M
$16.M
$14.M
$12.M
$10.M
$8.M
$6.M
$4.M
$2.M
$
FY2011
FY2012
FY2013
FY2014
FY2015
$2.2M
$6.2M
$7.1M
$2.4M
$6.M
$7.9M
$2.1M
$6.8M
$7.8M
$2.8M
$8.1M
$7.7M
$2.M
$7.8M
$7.7M
KBOs/TNOs
Comets
Asteroids

Keyword – Target Body, Small Bodies	FY2011	FY2012	FY2013	FY2014	FY2015
Asteroids	$7.1M	$7.9M	$7.8M	$7.7M	$7.7M
Comets	$6.2M	$6.M	$6.8M	$8.1M	$7.8M
KBOs/TNOs	$2.2M	$2.4M	$2.1M	$2.8M	$2.M


OTHER BODIES (BY FY)
$25.M
$20.M
$15.M
$10.M
$5.M
$
FY2011
FY2012
FY2013
FY2014
FY2015
$1.8M
$90K
$2.4M
$3.9M
$7.8M
$564K
$2.5M
$353K
$2.M
$3.2M
$4.5M
$514K
$2.5M
$655K
$1.M
$3.M
$2.3M
$1.2M
$2.8M
$692K
$7.4M
$2.2M
$1.4M
$9.2M
$535K
$10.2M
$460K
$1.4M
Extra-solar Planets
Solar wind
Protoplanetary Disks
Presolar nebula
Potentially Hazardous Objects
Non-specific Planets
None Specified
Near Earth Objects
Interstellar grains
Hypervelocity Impacts
Dust

Keyword – Target Object, Other	FY2011	FY2012	FY2013	FY2014	FY2015
Dust	$564K	$514K	$1.2M	$1.4M	$1.4M
Hypervelocity Impacts	$759K	$729K	$570K	$233K	$86K
Interstellar grains	$558K	$296K	$	$126K	$106K
Near Earth Objects	$705K	$371K	$380K	$279K	$197K
None Specified	$7.8M	$4.5M	$2.3M	$2.2M	$460K
Non-specific Planets	$3.9M	$3.2M	$3.M	$7.4M	$10.2M
Potentially Hazardous Objects	$27K	$76K	$50K	$53K	$
Presolar nebula	$2.4M	$2.M	$1.M	$158K	$126K
Protoplanetary Disks	$90K	$353K	$655K	$692K	$535K
Solar wind	$266K	$270K	$103K	$22K	$80K
Extra-solar Planets	$1.8M	$2.5M	$2.5M	$2.8M	$9.2M


R&A INVESTMENT BY FISCAL YEAR - SCIENCE DISCIPLINE
DRAFT – Not to Share
$150.M
$140.M
$130.M
$120.M
$110.M
$100.M
$90.M
$80.M
$70.M
$60.M
$50.M
$40.M
$30.M
$20.M
$10.M
$
FY2011
$1.5M
$20.1M
$5.9M
$12.4M
$7.1M
$15.M
$12.1M
$5.4M
$30.3M
FY2012
$1.2M
$18.3M
$4.2M
$11.1M
$9.M
$17.7M
$12.M
$5.4M
$29.8M
FY2013
$3.1M
$17.4M
$5.8M
$9.6M
$8.9M
$17.1M
$11.9M
$4.1M
$28.5M
FY2014
$2.9M
$9.6M
$6.1M
$13.2M
$9.2M
$16.9M
$12.3M
$6.4M
$31.9M
FY2015
$6.8M
$11.4M
$8.8M
$18.3M
$12.8M
$18.5M
$16.6M
$6.7M
$36.4M
Unspecified
Spectroscopy
Solar System Dynamics
Planetary Protection
Planetary Dynamics
No Keyword
Mineral Physics
Magnetospheres
Geophysics
Geology
Geochemistry
Exosphere
Cosmochemistry
Atmospheres
Astrophysics
Astronomy
Astrobiology

Keyword – Science Discipline	FY2011	FY2012	FY2013	FY2014	FY2015
Astrobiology	$30.3M	$29.8M	$28.5M	$31.9M	$36.4M
Astronomy	$5.4M	$5.4M	$4.1M	$6.4M	$6.7M
Astrophysics	$125K	$57K	$48K	$43K	$
Atmospheres	$12.1M	$12.M	$11.9M	$12.3M	$16.6M
Cosmochemistry	$15.M	$17.7M	$17.1M	$16.9M	$18.5M
Exosphere	$466K	$500K	$1.5M	$2.4M	$2.5M
Geochemistry	$7.1M	$9.M	$8.9M	$9.2M	$12.8M
Geology	$12.4M	$11.1M	$9.6M	$13.2M	$18.3M
Geophysics	$5.9M	$4.2M	$5.8M	$6.1M	$8.8M
Magnetospheres	$2.7M	$2.6M	$2.2M	$2.6M	$3.8M
Mineral Physics	$45K	$104K	$50K	$130K	$302K
No Keyword	$20.1M	$18.3M	$17.4M	$9.6M	$11.4M
Planetary Dynamics	$1.4M	$1.4M	$1.7M	$1.5M	$3.1M
Planetary Protection	$926K	$597K	$770K	$370K	$641K
Solar System Dynamics	$843K	$1.8M	$2.4M	$2.6M	$3.2M
Spectroscopy	$1.5M	$1.2M	$3.1M	$2.9M	$6.8M

Subpanels for Planetary Geology & Geophysics ROSES 2011-2013

- Geology A & B
- Geophysics A & B
- Remote Sensing A & B
- Dynamics (ROSES 2011, 2012)
- Mars (ROSES 2012)
- Outer Planets (ROSES 2012)
- Remote Sensing & Spectroscopy (ROSES 2012)
- Spectro/IR (ROSES 2011)

Subpanels – Solar System Workings 2014

- Atmospheres: Tenuous/Exosphere
- Impact Processes
- Petrology
- Space-Surface Interactions
- Spectroscopy: Outer Solar System and Comets
- Volcanism
- Atmospheres: Chemistry, Climate, Evolution & Variability
- Geophysics
- Icy Bodies
- Mineralogy
- Rings/Dynamics
- Spectroscopy: Inner Solar System and Small Bodies

Subpanels – Solar System Workings 2014

- Atmospheres-Surface Interactions
- Atmospheres: Structures /Dynamics
- Geomorphology
- Magnetospheric Processes and Dynamics
- Permafrost, Glaciers and Regolith

Subpanels – Solar System Workings 2015

- ATM Surface Coupling
- ATM – Tenuous
- Petrology
- Tidal Dynamics and Heating
- Asteroids
- Atmosphere: Chemistry & Lab Studies
- Atmosphere: Structure/Dynamics
- Regolith

Subpanels – Solar System Workings 2015

- Aqueous Geochem
- Chlorine, Isotopes and Sulfates
- Comets
- Spectroscopy
- Atmospheres: Ionosphere, Mesosphere & Thermosphere
- Geomorphology
- Orbit/Soin Dynamics
- Space-Surface

Subpanels – Solar System Workings 2015

- ATM-Surface Coupling
- ATM-Tenuous
- Petrology
- Tidal Dynamics
- Geophysics
- Impact Processes
- Magnetospherics
- Volcanism

Principles of SMD's Research and Analysis (R&A) Peer Reviews

- SMD manages its R&A programs strategically, increasing the return from missions in progress or completed, and laying the groundwork for missions yet to be initiated.
- SMD seeks the input of the scientific community, as appropriate, in evaluating the scientific/technical merit, programmatic relevance, and cost reasonableness and realism of proposals.
- SMD places the highest value on fair, unbiased, unconflicted, and competent reviews of all compliant and responsive proposals submitted.
- SMD protects the confidentiality of proposers and reviewers, as well as the sensitive and proprietary content of proposals.
- SMD strives to provide clear feedback to proposers in a timely fashion, including the disposition of the proposal and the major factor(s) that led to the selection or not of the proposal.
- SMD entrusts its Program Officers with the responsibility and the authority to implement its principles and policies and to present well-supported selection recommendations to the Selection Official.
- SMD charges its Selection Officials with advancing NASA's strategic goals and maximizing the science return within programmatic constraints by executing their judgment in making selection and nonselection decisions.

4. A detailed breakdown of the process from proposal submission to assignment of proposals to the subpanels, noting especially the roles of the caucus members, the panel chair and the group chiefs (understanding that there is variance between program elements in how this is done).

SMD Policy Document SPD-22: Management of ROSES Peer Review and Selection Process

Step-1 proposals are submitted by Authorized Organizational Representative (AOR) to the NSPIRES system prior to published deadline. A master list is provided to the Discipline Scientist (caucus lead) who shares with his/her caucus.

Caucus meets to discuss encourage/discourage decision for all compliant Step-1 proposals.

Encourage/discourage letters are uploaded in NSPIRES and released to proposers.

Caucus meets to sort proposals into “like subpanels” of generally similar size, i.e. similar number of proposals typically less than 20 but with a common theme or discipline. Sometimes, a panel chair has already been identified and participates in the sorting.

Caucus members and panel chair identify candidates for group chiefs (also referred to as subpanel chairs) and then start populating panels and making review assignments.

Panel Chair typically has telecons with the Group Chiefs and there is some horse trading of proposals between subpanels. The search for panelists almost always yields external reviewers as people who can’t attend in person but will review. This process gets iterated until each proposal has at least two panel reviewers and 1-3 external reviewers.

Peer Review
(From Guidebook for Proposers)

- To be competitive for selection, proposals must fully satisfy the evaluation criteria as determined by peer review for scientific and/or technical merit, and by programmatic evaluation for cost and relevance by NASA. (NASA peer review members may also participate in determining the relevance of a proposal to NASA program objectives and the realism and reasonableness of proposed costs.

- Following peer evaluation, the cognizant NRA Program Caucus will consider the competitively rated proposals in the context of the programmatic objectives and financial limitations stated in the NRA.

- The Caucus will present a recommendation for selection based on the entirety of these factors to the NASA Selection Official identified in the NRA.

5. A detailed breakdown of the post-panel process – how do the results of the subpanel reviews turned into a prioritized list of proposals for funding across the entire program element, and what are the roles of the caucus members, panel chair and group chiefs in this process? How is programmatic and discipline balance maintained?

SMD Policy Document SPD-08: Requirements for Selection Decision Documents for NASA Research Announcements including ROSES

Within 4 weeks of the end of the review panel, the caucus lead and caucus members prepare the Selection Requirements Package (SRP), including a draft Selection Decision Document (SDD), and the caucus lead signs the SRP and presents the SRP to the selection official (SO).

The SDD must contain,

> "A brief rationale for the selection based upon the expert evaluation of proposals be a peer review panel in accordance with the evaluation criteria defined in the NRA, and incorporating programmatic factors; and
>
> A brief description of the post-panel decision making process used to arrive at the selection. In particular, the selection of proposals identified by the peer review as having a lower evaluation result than those not seslected must be explained."

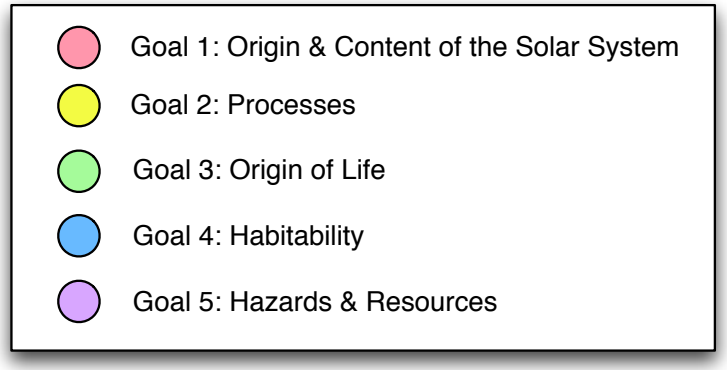
The selecting official selects a subset of the submitted proposals, fully or partially, and declines to select the rest, and signs the Selection Decision Document

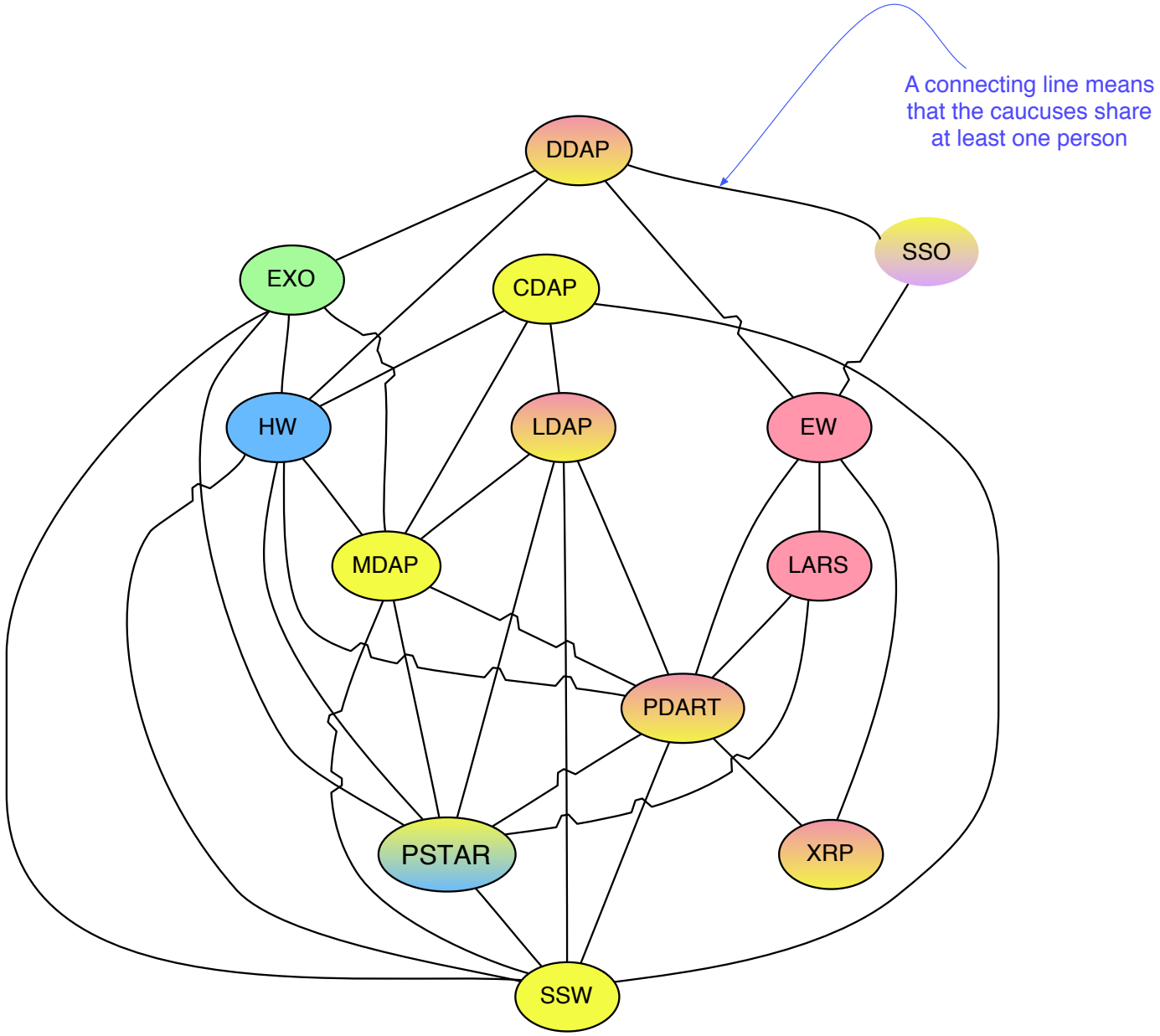
Once the review panel is done, the roles of panel chair and group chief are complete, they do **not** participate in the preparation of the Selection Requirements Package. They may however be contacted to participate in a request for reconsideration at the caucus lead's discretion.

Programmatic and discipline balance is discussed during the selection meeting with the SO. Typically in preparing the SDD, the caucus lead in conjunction with the caucus would identify any imbalance either extant in the program or one that would result from the selection recommendation and make adjustments

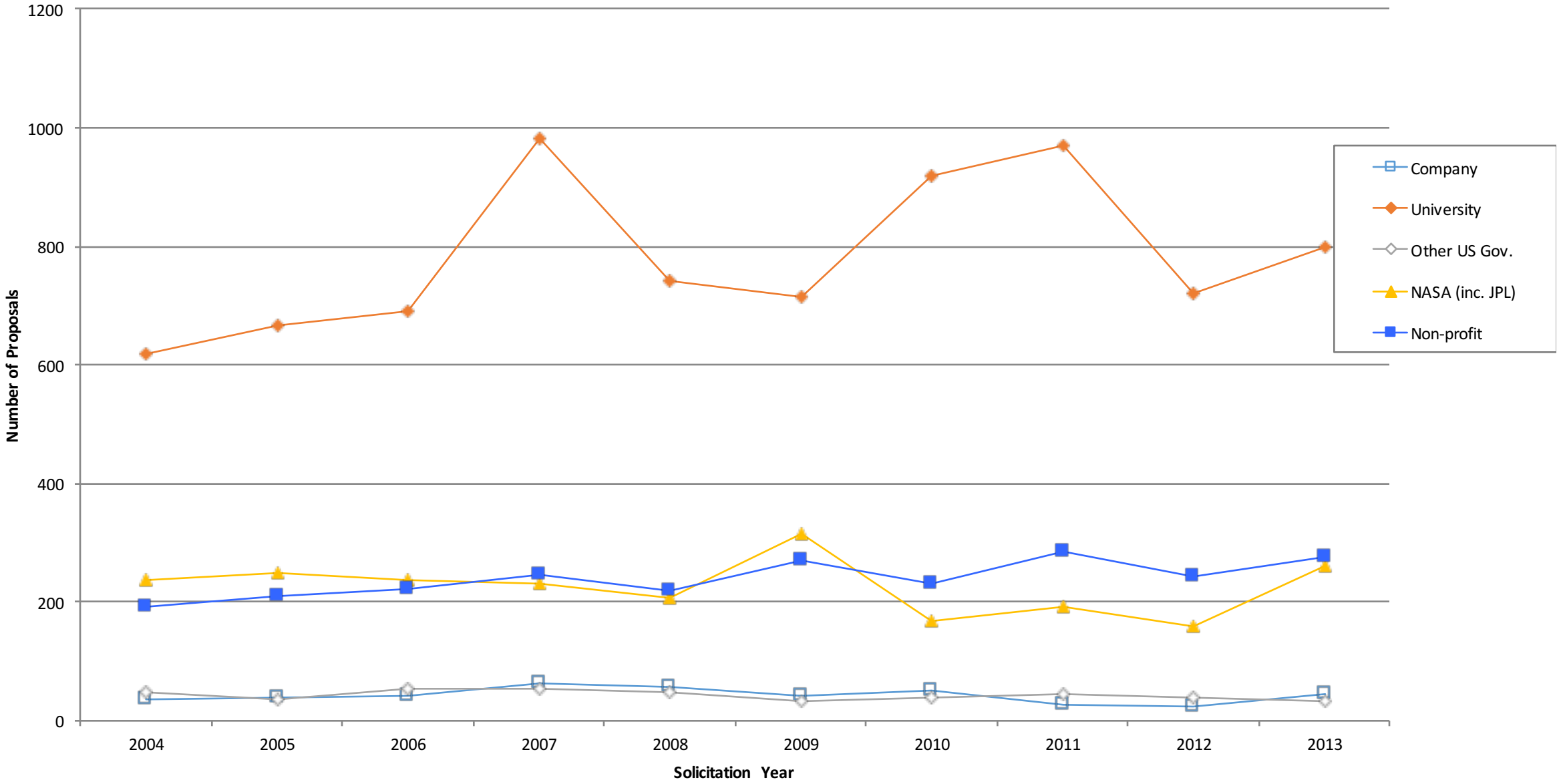
Caucus Network Diagram

How caucuses overlap and inform one another and address our strategic goals

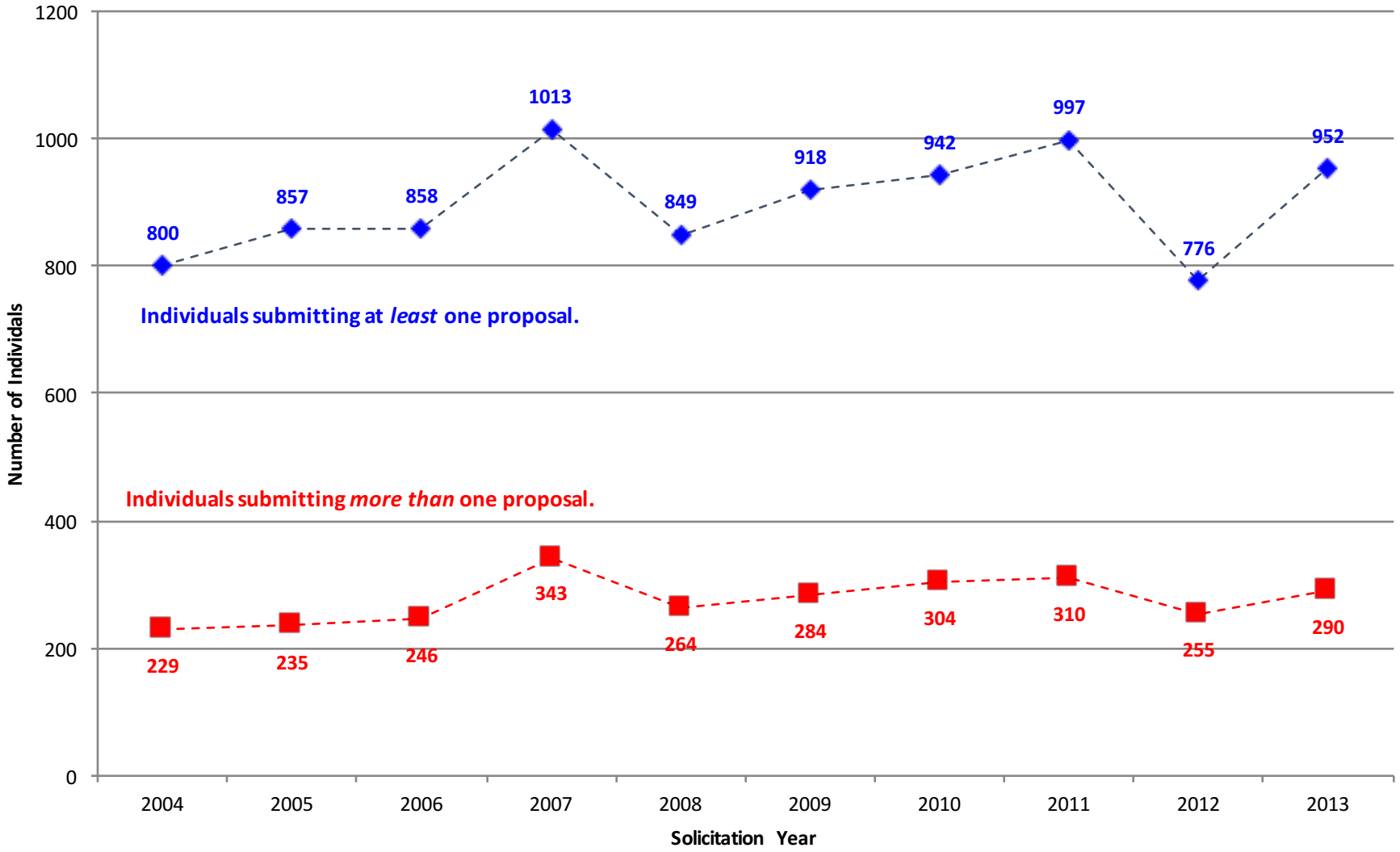




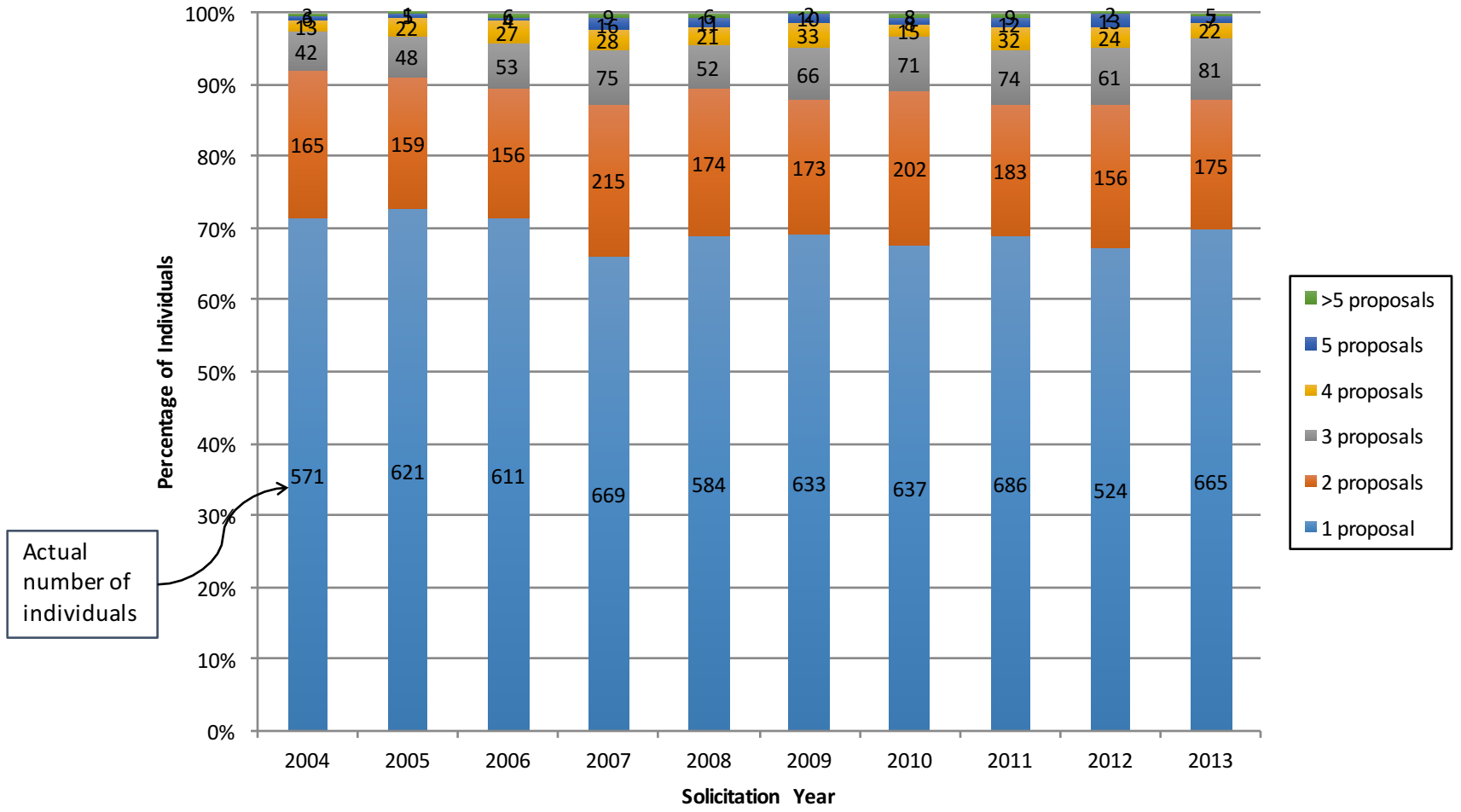
Proposals by Organization Type



Community Proposal Workload (1)



Community Proposal Workload (2)



http://www.lpi.usra.edu/nuggets/