**The National Land Cover Database Project: The Story of Its Impact**

**C. Deering, GSA, Vancouver, Canada, 2014**

There’s a **lot of conversation today about metrics and alternative metrics** and **how those measures may or may not help us assess the value of science research.**

It’s **easy to get caught up** in all that**, and forget that numbers are never enough.**

**My goal today is to demonstrate how we can look within and beyond numbers and discover the value, the impact, of science research.**

**We need to slice and dice, dissect a research effort, look at all its parts.**

**Typically there is value in every chapter of any strong science research project.**

**For the next several minutes, I’m going to slice and dice the National Land Cover Database project, and show you what I mean.**

**“Àla” Paul Harvey, who so many times told us “the rest of the story,”**

**I’m going to tell you “the rest of the NLCD story,”**

**the story of its undiscovered, unrecognized,**

**multi-dimensional effect.**

When we **slice and dice the NLCD** project,

when we **look within numbers and beyond numbers**,
we **uncover a story of remarkable influence, broad and deep impact.**

**Paul Harvey.**

**Remember how he told us the “rest of the story.”**

The “rest of the story” **could be delightful, fascinating, surprising, thought-provoking.**

We typically said to ourselves at the end of a Paul Harvey radio broadcast, **“Wow, I didn’t know that!”**

So what does Paul Harvey and **his knack for digging deeper and finding more have to do with the NLCD?**

I would argue that **there is a “rest of the story” in the NLCD project.**

It’s a story that **goes beyond the surface story of simple metrics by which we typically assess science – citations to publications or data downloads.**

It’s a story of **undiscovered, unrecognized, multi-dimensional effect.**

When we slice and dice the NLCD project, when we look beyond and within the numbers, we **uncover a story of remarkable influence, broad and deep impact.**

**That’s the story I’m going to tell you today.**

But first, what is the National Land Cover Database project? What does it do?

**“I’m going to give you a quick, sound-byte rendition....**

In its **20+ years**, it has created **4 epochs** of land cover products from **Landsat imagery and ancillary datasets.**

All epochs cover the **conterminous U.S**., and two epochs include **Alaska, Hawaii, and Puerto Rico.**

The products provide

**spatial reference and descriptive data**

for land cover **thematic class,**

**impervious surface,**

**tree canopy,**

**and change monitoring products.**

The latest product, NLCD2011,

**comprises 9 billion geographic cells,**

**16 classes of land cover, and**

**30 billion pixels!**

Clearly the NLCD is a

**large and long-reaching project**.

It’s also a **project with a story of impact,**

**that begins with . . . . . Collaboration**

The NLCD, a **USGS-led project,**

has been the lead in a **20+ year collaborative** effort

called the **Multi-Resolution Land Characteristics Consortium**

that **comprises 10 federal agencies.**

The members use **Landsat and ancillary data**

**to develop a variety of land cover products**.

Over the years:

**Has emerged as a model of strong and successful federal agency interaction and collaboration.**

**Members have shared resources – methods, techniques, research as well as financial resources,
to create land cover products together that none could have created alone**

Their cooperative efforts have

**advanced our understanding of the environment and**

**increased the capacity for scientific problem-solving.**

But what about **beyond the consortium?** How has NLCD **promoted its land cover products** and **put those products in the hands of researcher, the applied user community, and the public?** And how have the **products been received?**

The NLCD project has a **global reach via the formal channels of science communication** (jour and conf).

NLCD has **racked up some impressive numbers** as you can see within those channels.

But I stated at the top of this presentation that
**we have to look at more than numbers**.
So what of the **impact in this part of the story?
What is the story within the numbers?**

First, outreach efforts are

**effectively communicating project work,**
**a** **necessary step in realizing and extending impact within the science community.**

Second, NLCD products are

**providing tools for science discovery and problem-solving,**

**tools that are being used by researchers across disciplines and institutions and countries.**

And finally, NLCD is

**serving needs in the research community
for land cover and land change data.**

The **global reach of NLCD is also realized through its Web and social media presence**.

The **MRLC Web site facilitates access to NLCD products** for all levels of users.

The **Land Cover Institute, via its Web site,**

**facilitates land cover/land change science** by **assisting with access to, and technical support for, land cover data** from the NLCD project as well as data for dozens of agencies and institutions.

Finally, NLCD uses **major social media venues to promote its land cover products and assist users of the products**.

From **formal channels to the Web to social media, the project is**

**proactive in increasing visibility of NLCD products and engaging researchers, applied users, casual users.**

And is that **proactive effort paying off? Yes! Without a doubt!**

Every **fiscal year NLCD data product downloads register in the many thousands.**

Usage of products **typically trends upward until a new product is released.**

But even with **each new epoch of the NLCD, earlier datasets are consistently downloaded.**

**NLCD1992 products**, for example, **continue to be downloaded** in the thousands each year.

And, more than **50 peer-reviewed publications have cited NLCD1992 so far this year** (per the Scopus index).

**Clearly, the NLCD project and its land cover products**

**are addressing needs for land cover and land change data.**

And here are **two eye-opening numbers** underscoring

the **importance of NLCD products to researchers and the user community.**

No program of this size can sustain itself if it does not engage in R & D. And the NLCD is no different.

What is significant here is that

**within the NLCD R&D efforts,**

**we can find more instances of project impact.**

I show you a busy slide to yes, overwhelm you!

To **relay visually what mere words cannot –**

**the scope of NCLD research and development.**

**Each epoch has built upon the former,**adding value to the NLCD project.

Research and development efforts

**have led to new and improved instruments, methods, algorithms, protocols, scripts, accuracy assessments** **–**

**that have improved and extended the NLCD land cover products,**

**and that also have saved time and money in product development and processing.**

The value of the NLCD R&D efforts

**extend beyond the project itself,**

**as improved technologies have been shared with other programs within the consortium**

**as well as the larger research community.**

**Looking at the big picture. . . . .**

Successive epochs of land cover products have

**pushed forward the boundaries of land science,**

**building capacity for study, discovery, and problem solving.**

Early on the project

**changed the paradigm in land cover mapping,**

**then built upon that concept,**

**and continued to move it forward with leading edge research and discovery in accuracy assessment,**

**as well as with expanded capabilities.**

All these chapters of the NLCD story, the story of impact up to this point,

**is what makes possible the most prized measure of impact for the project . . .**

**Real World Value**

**The next 6 slides throw the spotlight**

**on research and studies and applications that have relied on the NLCD.**

A 2002 **article in Stone Environmental’s company newsletter described the use of the NLCD in its watershed characterizations and concluded the piece by recommending NLCD to its clients.**

Researchers in 2004 **looked at human settlement and anthropogenic landscape change across the north-central U.S. and concluded there would be a future need for a reformulation of resource management policies.**

A 2007 **study by the Pennsylvania National Heritage Program used NLCD products in its assessment of threats to aquatic diversity, assessments that led to conservation planning and watershed management.**

And also in 2007 researchers **enhanced the NLCD products to determine percentage of roadless space in the lower 48.**

Research in 2012 **identified areas in the northern Great Plains grasslands where wind development would have few impacts on wildlife.**

A 2014 **New Hampshire study used the NLCD in determining the return on investment of land and water conservation.**

**The reach and value of NLCD to**

**land science research, and in**

**science applications that improve our world,**

**is remarkable.**

To **rigorously assess the value** of science research,

you have to **examine the project, all of its parts.**

What is the **point of science research?**

To **add** to the world’s knowledge?

To **improve** our world?

To **inspire** further research?

**It’s all this, and more.**

But how do you know **if your science is making a difference,**

**is of any value,**

**is having any impact,**

**is changing, shaping, altering, transforming our world for the better.**

**You can look at conventional metrics. Yes, they can be indicators of impact.**

**But don’t overlook the “rest of the story.”**

Look for **impact, all along the research story.**

**Slice, dice, dissect . . . . .and find more.**

When we **look closely at the NLCD project,
when we put it under a microscope,
only then can we find the story of its impact**,

we **uncover a story that is rich and revealing,
multi-faceted, broad, deep.**

It’s a story that **could never be told by numbers alone.**

**To uncover the impact of any science effort,
take a page from Paul Harvey and
seek out “the rest of the story.”**

**You’ll find a rich and revealing story**

**of science and scientists,**

**a story of real people**

**working in the real world**

**making real improvements.**