

DryadUK Sustainability Planning Report

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1. Introduction

This report is intended to inform Dryad's sustainability planning. It is based on the 2010 Draft Recommendations for Dryad's Sustainability Planning report from Charles Beagrie Ltd (<http://www.beagrie.com/publications.php>) and Cost Models for Dryad by Lorraine Eakin and the Dryad Project Team, and expanded with experience gained during the DryadUK project.

The data behind research publications in the biosciences are not commonly made openly available to readers of those publications. The Dryad Data Repository, <http://datadryad.org/>, founded and run by a consortium of journals, hosts data relating to peer-reviewed journal articles and solves this problem by integrating the open archiving of research datasets by authors with the journal article submission workflows of publishers.

The Dryad-UK project, which ran from 2010-2011, aimed to help extend Dryad in terms of sustainability planning, expanding its publisher base and scope, testing a mirror installation, investigating improved metadata, and developing an assessment framework. For full details of the project please see the final report (<http://wiki.datadryad.org/DryadUK>).

This report focuses on the sustainability planning activities of DryadUK. By gathering feedback from publishers, funders and researchers in the UK, the project aimed to inform the governance model and the sustainability planning for Dryad as an international organisation. This involved four main activities:

1. A workshop at the British Library on April 1st 2011 with all main UK stakeholders
2. Ongoing consultation with UK publishers during their integration with Dryad as part of the project
3. Input into the July 2011 Dryad Executive Committee and Consortium Board meetings in Vancouver
4. Trialling of an international mirror service for Dryad at the British Library

The following sections summarise these activities, outline the new governance model and pricing plan that have since been adopted, and revise the financial projections made in the 2010 report accordingly.

2. DryadUK Activities

2.1 The DryadUK Sustainability Workshop

The DryadUK project held a workshop on sustainability at the British Library on April 1st 2011. The aim of the workshop was to gather stakeholder feedback on appropriate funding models for Dryad as an international organisation, and examined mixed funding models involving subscriptions, submission fees, hosting of services, and grants. A full report on the workshop is available online (<http://wiki.datadryad.org/DryadUK>).

Attendees of the workshop were presented with the tiered fee structure below (table 1), and asked for their feedback.

	A Full	B Associate	C Author pays
Joining fee (waived for charter members)	\$1000 / £624	\$1,000 / £624	NA
Annual fee from journal	Prospective	Retrospective	0
a. all peer-reviewed articles in prior yr	\$25/article /	\$100/article /	
b. articles with data deposited to Dryad	£16/article	£62/article	
Author charge at deposit	0	0	\$200 / £125
Length of contract	3 or 5 yrs	3 or 5 yrs	n/a
Legacy data deposits free?	Y	N	N
Can move between plans A & B	Y	Y	n/a
Representative on Consortium Board	Y	Y	N
Can vote on board and serve on executive committee	Y	N	N
Coordinated data deposit	Y	Y	Y/N
Data DOI in published article	Y	Y	Y/N
Branding of journal content	Y	Y	N

Table 1: The proposed Dryad fee structure presented at the workshop.

There was general consensus that the proposed funding model does address the situation of most publishers and journals well, although large publishers felt that they should receive a discount for providing a greater volume of submissions, and that for

this to be paid in advance it would need to be based on a realistic estimate of the number of submissions likely. There was some concern expressed that authors might be put off depositing via plan C, or might choose an A or B subscribing journal instead. Funders on the other hand were worried that plan C might result in a significantly increased burden for them if enough authors went to non-subscribing journals.

This feedback was further discussed with UK publishers during the following three months, and then used to help construct a further proposal put to the Dryad Consortium Board meeting in July 2011.

2.2 Consultation with UK-based Publishers

During the DryadUK project the following publishers agreed to both integrate one or more of their journals with Dryad, and to provide more in-depth feedback on the proposed funding model:

- BiomedCentral
- The BMJ
- The British Ecological Society
- Elsevier
- Oxford University Press
- PLoS
- Wiley Blackwell

Of these publishers, the BMJ, PLoS and Wiley Blackwell all sent representatives to the consortium board meeting in Vancouver in July 2011 to ensure that their perspectives were taken into account.

2.3 The 2011 Dryad Consortium Board Meeting

The full report of the Consortium Board meeting held in Vancouver in July 2011 is available online (http://wiki.datadryad.org/Board_Meeting_2011_Summer). Of relevance to this report, proposals for the Dryad governance and funding models were presented based in part upon the DryadUK consultations following discussion by the Executive Committee, and were debated at length by the participants.

In summary, the meeting proposed the following refinements to the models, to be put by the Executive Committee to all Consortium Partners for an official vote in 2012.

Governance

- Incorporation of Dryad as a US tax-exempt not-for-profit organisation.
- A twelve-person Board of Directors, vested with legal and financial responsibility for Dryad
 - Directors to serve for staggered three-year terms and able to serve multiple terms
 - Directors to be elected by (but not necessarily from) the members
 - Board members to appoint the officers of the Board, as well as to appoint *ex-officio* members as required.

- Dryad executive staff to be hired as employees, reporting to the Board of Directors.
- Membership of Dryad to be open to any legitimate organisation that supports its mission.
- Members to pay a modest annual fee, not to be depended on for revenue.
- Members to vote on amendments to the Articles and By Laws, and serve as an advisory body to the Board of Directors.

Funding Model

- A range of payment plans to be offered in order to account to differing usage models: Journal based, voucher, pay-as-you-go and author pays.
- No discounts for bulk deposits
- No setup costs

See section 3 for full details of the plan as it was eventually accepted.

2.4 The International Mirror Trial

The Dryad repository is receiving a steadily increasing volume of content from an ever-wider range of international sources. Because of this, its infrastructure needs to be able to scale correspondingly. A mirror server was therefore set up at the British Library in January 2011 as part of the DryadUK project to validate the use of the simplest and most cost-effective solutions to replication. The project was able to verify the cost of the mirror in terms of maintained hardware at the library, but did not explore other areas such as the costs of local curation of deposits. For full details please see the DryadUK final report (<http://wiki.datadryad.org/DryadUK>).

The annual cost of the mirror at the British library was £2850. This was a fixed cost charged directly by the British Library that would be expected to increase in line with inflation.

3. The Agreed New Pricing Plan

The following pricing plan was approved by an official vote of all Dryad consortium partners in 2012, based on that proposed at the board meeting in July 2011 and outlined above in section 2.3:

Intent of cost-recovery

The revenue streams proposed here are for recovery of operating costs (e.g. business management, curation of new deposits, user support, interoperability with new journals, migration and replication of content, hardware software maintenance, costs of outside services, etc.). Research and development of new capabilities will continue to be funded through project grants, and Dryad will continue to seek support from foundations, government funding bodies, and private donors to support its core mission and reduce costs to users.

Payment plans for deposits

Deposits may be paid in one of four ways. The initial, baseline, member-discounted rate per data package (including all the material associated with one published

article) will be approximately \$50, pending review of budget projections by the elected Board of Directors. The plans charge at a rate that may differ from the baseline to reflect differences in transaction and business costs. The plans are:

A. Journal-based payment:

The organization prepays to cover all data packages associated with that journal or journals that may be received during the time of the contract. The annual fee is half the baseline charge times the average annual number of research articles published in the previous three years. Contracts are undertaken for 3 or 5-year terms.

B. Voucher-based payment:

The organization pays in advance at the baseline rate for a fixed number of data packages. There are no bulk discounts.

C. Pay-as-you-go:

The organization commits to pay retrospectively for the number of data packages made during the previous period (e.g. quarterly or annually). Deposits would be charged at the baseline rate plus a surcharge reflecting the costs of delayed payment. There are no bulk discounts. Contracts are undertaken for 3 or 5-year terms.

D. Author-pays:

An author may pay for an individual deposit from either an integrated or non-integrated journal when that journal does not have a contract for one of the plans above. Deposits are charged at the baseline rate plus a surcharge reflecting the increased transaction cost associated with individual payments. Deposits from non-integrated journals have an additional surcharge reflecting the additional costs of curation that are required.

Large-volume surcharges

Under all four plans, unusually large deposits are assessed a surcharge to cover projected excess storage costs. The current threshold is 10GB per data package.

No set-up costs

No charge shall be levied for setting up standard integration of data submission to Dryad via the manuscript handling system of a journal.

Waivers

Where deposit costs are not otherwise covered, the repository will seek to provide waivers for deposits from authors in low-income countries.

Member discounts

The above rates reflect a 10% discount for deposits associated with Members in good standing.

Eligibility

Organizations eligible for Plans A through C include individual journals, publishers of multiple journals (e.g. learned societies or publishers), and other organizations eligible to be Members. It is not necessary that the organization be a Member to enroll in one of the plans.

Membership dues

Membership in Dryad is defined within the proposed By Laws. Essentially, members elect the Board Of Directors, vote on amendments to the core governance documents, and receive the benefits of participation in membership forums. Annual membership dues of \$1000 help defray the communication and meeting costs associated with a large membership-based organization.

Membership is not required for integration of manuscript and data submission, nor for participation in one of the deposit payment plans described above. Members do receive the member discount for deposits, as described above.

Charter members

Charter Members are those that were counted as Interim Partners at the time of the July 2011 Board Meeting. Annual dues are waived for Charter Members for the first three years in which dues are levied.

Annual review of cost recovery plan

The cost-recovery framework, including the detailed charging scheme, will be reassessed by the Board of Directors on an annual basis.

4. Financial Projections

4.1 Projections made in the 2010 report

The 2010 report from Charles Beagrie Ltd can be accessed in full online (<http://www.beagrie.com/publications.php>). It provided financial projections for Dryad based on three scenarios:

1. Per paper charges dominant
2. Annual subscriptions dominant
3. Per paper charges and subscriptions balanced

These scenarios plus the then estimated costs of the repository are summarised below. Section 5.2 will then present updated projections based on Dryad's new funding plan and current expectations of its usage.

4.1.1 2010 estimated baseline costs

Assumptions

1. The preliminary baseline is based on initial figures supplied by the Dryad project team and will need to be refined and developed in coming months.
2. The **minimum** level of appropriately skilled staff is sufficient to (a) deal with the **lower** estimated number of datasets per annum ingest rate of 5000, based on an analysis by the Dryad project team of partner journal articles

- assuming 30 participants; (b) grow journal participation and support for the repository at levels required for sustaining the repository.
3. More curation effort will be required if the ingest rate raises above the minimum or if curation is required above the lowest level.
 4. No peer review for supplementary data, (JAMA curation level “zero” re editing of data – see JAMA model in next section) and lowest level of curation by Dryad.
 5. A 5 year equipment cycle with procurement fund to be accumulated per annum to provide for capital replacement in 2015. (Based on equipment budget for hardware for period 2010-2015.) Hardware maintenance costs not included.
 6. No inflation factor built in and cost estimates not verified against local conditions.
 7. Personnel benefits at a rate of 20%. Salaries only based on estimates until future job descriptions and grade levels agreed with host institution.
 8. All personnel are co-located for viable service cover and flexibility. Fractions of FTEs are amalgamated as far as possible into viable full-time or half-time FTE job descriptions for ease of management and recruitment and retention.

	FTE %	Annual cost estimate (\$k)
Staff costs (FTEs)		
Part-time Director (10% of PI)	10%	10.8
Technical Manager, including technical coordination / support (1 FTE but supported half time by external funding leaving 0.5 FTE funding for Dryad base-line)	50%	36.0
Communications and outreach officer	50%	24.0
Programmer	25%	20.0
Curator [Curating a max of 5000 papers at a minimum level, <i>OR equivalent using student</i>	72% OR	43.2 OR

	FTE %	Annual cost estimate (\$k)
<p style="text-align: right;"><i>curators]</i></p> <p>See note¹ and table below for “hours” calculation and student curator approach with a breakdown based on different levels and throughput of papers.</p>	1250 hours	18.75 + management o/h
Total Staff	2.07	\$134,000 (OR) \$109,550
Non-staff items		
Equipment costs averaged p.a. over 5 years (requirements <i>to be reviewed</i> once workflows fully established and new hardware in place after 2010) Excludes hardware maintenance costs.		18.6
Travel (staff)		5.0
Travel (board meetings)		10.0
Promotional materials		6.0
Outsourcing – facilities management (FM)		<i>To be determined</i>
Total non-staff items		\$39,600 (+FM)
Support services (in-kind contribution to be investigated)		
Secretarial and accounting	50%	24.0
Equipment costs (networks, office etc)		6.08
Office supplies and expenses		3.0
Estate costs (office accommodation)		<i>Local calculation to be applied</i>
Support services total		\$33,000 (+ accommodation)

Table 5: 2010 estimated minimum viable base-line cost for Dryad at launch.

¹ **Note** that the number of hours per annum for the Curation Officer in table 5 is based on 46 working weeks x 5 days per week x 7.5 hours per day = 1725 hours per annum. Also the management overhead associated with employing student curators needs to be accounted for in addition to the rates in table 7 below. Effort will be dependant upon the numbers employed and the student curator turnover rate and the type of QA processes put in place.

4.1.2 Scenario One – per paper charges dominant

In this scenario, Dryad aims to recover in the region of 80% of its operating costs via a use fee to journals based upon papers deposited with supplementary data. The remaining 20% is covered by an annual subscription to Dryad charged to journals. This places the emphasis upon a journals’ actual use of Dryad so a journal with few papers will pay significantly less than one with a great many. An annual subscription charge provides an upfront commitment from members and a predictable income to Dryad over 12 months. Keeping this relatively low reduces the hurdle for journals but will present a risk to Dryad in that it becomes dependant upon journals depositing papers to the level that will provide enough revenue to break even. If a journal experiences unexpected increases in the number of papers being deposited in Dryad they will either end up exceeding their budget forecasts, or they may hold back on depositing papers for a time. Neither of these outcomes would be satisfactory. If use based fees are retrospective then a lead-in time is needed for budgeting i.e. potentially an 18-24 month period before a 12 month retrospective billing can be made. So, for an “average” journal producing annually in region of 175 papers with supplementary data to be deposited in Dryad the following could apply where the price per paper is set at \$25 and the annual subscription at \$1100:

No. of total journal members in Dryad	Total annual subscription revenue (\$)	Total annual per paper revenue (\$)	Total annual revenue (\$)	Estimated annual operating cost (\$)	Funding gap (\$)
60	66,000	262,500	328,500	319,400	+9,100
45	49,500	196,875	246,375	300,300	- 53,925
30	33,000	131,250	164,250	281,200	-116,950
15	16,500	65,625	82,125	272,100	- 189,975

Table 2: Possible revenue projections in Scenario One.

4.1.3 Scenario Two – annual subscriptions dominant

In this scenario Dryad aims to recover in the region of 80% of its operating costs via an annual subscription charged to journals. The remaining 20% is covered by a use fee to journals based upon papers deposited with supplementary data. This places the emphasis upon a journals’ committing the greater part of their payments to Dryad up front. It would offer a degree of budgetary certainty and predictability for journals. It would also lower the per paper price considerably thereby possibly encouraging greater use of Dryad by subscribing journals. For Dryad it would guarantee revenues covering the majority of its’ operating costs and reduce the risk associated with fluctuating rates of deposit of papers by journals. Being less dependant upon retrospective billing for use fees (as mentioned in scenario one) Dryad should experience improved cash flow and easier management of its budgets.

So, for an “average” journal” producing annually in region of 175 papers with supplementary data to be deposited in Dryad the following could apply where the annual subscription is \$4500 and the price per paper is set at \$5:

No. of total journal members in Dryad	Total annual subscription revenue (\$)	Total annual per paper revenue (\$)	Total annual revenue (\$)	Estimated annual operating cost (\$)	Funding gap (\$)
60	270,000	52,500	322,500	319,400	+3,100
45	202,500	39,375	241,875	300,300	- 58,425
30	135,000	26,250	161,250	281,200	-119,950
15	67,500	13,125	80,625	272,100	- 191,475

Table 3: Possible revenue projections in Scenario Two.

4.1.4 Scenario Three – per paper charges and subscriptions balanced

In this scenario Dryad aims to recover 50% of its operating costs via an annual subscription to Dryad charged to journals and 50% covered by a use fee to journals based upon papers deposited with supplementary data. This places an equal emphasis upon both subscription and use fees.

So, for an “average” journal producing annually in region of 175 papers with supplementary data to be deposited in Dryad the following could apply where the annual subscription is \$2,750 and the price per paper is set at \$15:

No. of total journal members in Dryad	Total annual subscription revenue (\$)	Total annual per paper revenue (\$)	Total annual revenue (\$)	Estimated annual operating cost (\$)	Funding gap (\$)
60	165,000	157,500	322,500	319,400	+3,100
45	123,750	118,125	241,875	300,300	- 58,425
30	82,500	78,750	161,250	281,200	-119,950
15	41,250	39,375	80,625	272,100	-191,475

Table 4: possible revenue projections in Scenario 3.

4.2 2012 updated projections

The following updated projections are based on the new funding model proposed in Vancouver in July 2011 and officially adopted in 2012. The key changes from the 2010 report are:

- Full-time Director costed (as recommended in 2010 report);
- Full-time developer costed
- Incorporation of new funding model

The following factors are assumed:

4.2.1 Assumed income constants

- **Membership fee**
 - \$1000 per annum
- **Journal based deposits**
 - Deposit price of \$25 per research paper
 - Average number of papers per journal: 175
 - Average number of journals included per member: 5
- **Voucher deposits**
 - Deposit price of \$50 per research paper
- **Pay-as-you-go deposits**
 - Deposit price of \$50 per research paper
- **Author-pays deposits**
 - Deposit price of \$50 per research paper
- No discounts for bulk deposits
- No setup costs

Note: the pay-as-you-go and author-pays options will involve surcharges, but these have not been included here as they do not represent actual income.

4.2.2 2012 estimated baseline costs

Assumptions

1. The updated baseline is based on current estimated figures supplied by the Dryad project team.
2. The **minimum** level of appropriately skilled staff is sufficient to (a) deal with the **lower** estimated number of datasets per annum ingest rate of 5000, based on an analysis by the Dryad project team of partner journal articles assuming 30 participants; (b) grow journal participation and support for the repository at levels required for sustaining the repository.
3. More curation effort will be required if the ingest rate raises above the minimum or if curation is required above the lowest level.
4. No peer review for supplementary data, (JAMA curation level “zero” re editing of data – see JAMA model in next section) and lowest level of curation by Dryad.
5. A 5 year equipment cycle with procurement fund to be accumulated per annum to provide for capital replacement in 2015. (Based on equipment budget for hardware for period 2010-2015.) Hardware maintenance costs not included.
6. No inflation factor built in and cost estimates not verified against local conditions.
7. Personnel benefits at a rate of 20%. Salaries only based on estimates until future job descriptions and grade levels agreed with host institution.

8. All personnel are co-located for viable service cover and flexibility. Fractions of FTEs are amalgamated as far as possible into viable full-time or half-time FTE job descriptions for ease of management and recruitment and retention.

	FTE %	Annual cost estimate (\$k)
Staff costs (FTEs)		
Full-time Director (100% of PI)	100%	108
Technical Manager, including technical coordination / support (1 FTE but supported half time by external funding leaving 0.5 FTE funding for Dryad base-line)	50%	36.0
Communications and outreach officer	50%	24.0
Programmer	100%	80.0
Curator [Curating a max of 5000 papers at a minimum level, <i>OR equivalent using student curators</i>] See note² and table below for "hours" calculation and student curator approach with a breakdown based on different levels and throughput of papers.	72% OR 1250 hours	43.2 OR 18.75 + management o/h
Total Staff	3.7	\$291,200 (OR) 266.75
Non-staff items		
Equipment costs averaged p.a. over 5 years (requirements <i>to be reviewed</i> once workflows fully established and new hardware in place after 2010) Excludes hardware maintenance costs.		18.6
Travel (staff)		5.0
Travel (board meetings)		10.0
Promotional materials		6.0

² **Note** that the number of hours per annum for the Curation Officer in table 5 is based on 46 working weeks x 5 days per week x 7.5 hours per day = 1725 hours per annum. Also the management overhead associated with employing student curators needs to be accounted for in addition to the rates in table 7 below. Effort will be dependant upon the numbers employed and the student curator turnover rate and the type of QA processes put in place.

	FTE %	Annual cost estimate (\$k)
Outsourcing – facilities management (FM)		<i>To be determined</i>
Total non-staff items		\$39,600 (+FM)
Support services (in-kind contribution to be investigated)		
Secretarial and accounting	50%	24.0
Equipment costs (networks, office etc)		6.08
Office supplies and expenses		3.0
Estate costs (office accommodation)		<i>Local calculation to be applied</i>
Support services total		\$33,000 (+ accommodation)

Table 5: Current estimated base-line costs for Dryad

4.2.3 Cost assumptions made in projections

- **Fixed costs**
 - Salaries are assumed to be \$248,000 per annum based on table 5, excluding curation staff (calculated as variable based on volume)
 - Non-staff items are assumed to cost \$39,600 per annum based on table 5
 - Support services are assumed to cost \$33,000 per annum based on table 5
- **Variable costs**
 - Curation costs are assumed to be \$9 per paper, based on a salary of \$43,200 / 5000 deposits
 - The average number of papers per journal per year is 175
- **Costs to be determined**
 - Any outsourcing (facilities management)
 - Estate costs (office accommodation)

4.2.4 Scenario one: equal distribution

This scenario assumes that Dryad’s members opt equally for each of the three funding options (journal-based, voucher-based and pay-as-you-go), and that an additional number of author-pays deposits equivalent to 25% of these are made.

	Journal members	Voucher members	Pay-as-you-go members	Author-pays (relative % of deposits)
Percentage of total members	33%	33%	33%	25%
Avg journals/vouchers/deposits	1	50	50	

No. of total members in Dryad	Total membership revenue (\$)	Journal total income (\$)	Voucher total income (\$)	Pay-as-you-go total income (\$)	Author-pays income (\$)	Total annual revenue (\$)	Estimated annual operating cost (\$)	Funding gap (\$)
150	\$150,000	\$218,531	\$124,875	\$124,875	\$117,070.31	\$735,352	\$444,226	\$291,125
135	\$135,000	\$196,678	\$112,388	\$112,388	\$105,363.28	\$661,816	\$431,864	\$229,953
120	\$120,000	\$174,825	\$99,900	\$99,900	\$93,656.25	\$588,281	\$419,501	\$168,780
105	\$105,000	\$152,972	\$87,413	\$87,413	\$81,949.22	\$514,746	\$407,138	\$107,608
90	\$90,000	\$131,119	\$74,925	\$74,925	\$70,242.19	\$441,211	\$394,776	\$46,435
75	\$75,000	\$109,266	\$62,438	\$62,438	\$58,535.16	\$367,676	\$382,413	-\$14,737
60	\$60,000	\$87,413	\$49,950	\$49,950	\$46,828.13	\$294,141	\$370,051	-\$75,910
45	\$45,000	\$65,559	\$37,463	\$37,463	\$35,121.09	\$220,605	\$357,688	-\$137,082
30	\$30,000	\$43,706	\$24,975	\$24,975	\$23,414.06	\$147,070	\$345,325	-\$198,255
15	\$15,000	\$21,853	\$12,488	\$12,488	\$11,707.03	\$73,535	\$332,963	-\$259,427

4.2.5 Scenario two: journal-based dominant

This scenario assumes that 50% of Dryad’s members opt for the journal-based funding option, only 25% each for the voucher and pay-as-you-go based options, and an additional number of author-pays deposits equivalent to 25% of those made by members.

	Journal members	Voucher members	Pay-as-you-go members	Author-pays (relative % of deposits)
Percentage of total members	50%	25%	25%	25%
Avg journals/vouchers/deposits	1	50	50	

No. of total members in Dryad	Total membership revenue (\$)	Journal total income (\$)	Voucher total income (\$)	Pay-as-you-go total income (\$)	Author-pays income (\$)	Total annual revenue (\$)	Estimated annual operating cost (\$)	Funding gap (\$)
150	\$150,000	\$328,125	\$93,750	\$93,750	\$128,906.25	\$794,531	\$472,475	\$322,056
135	\$135,000	\$295,313	\$84,375	\$84,375	\$116,015.63	\$715,078	\$457,288	\$257,791
120	\$120,000	\$262,500	\$75,000	\$75,000	\$103,125.00	\$635,625	\$442,100	\$193,525
105	\$105,000	\$229,688	\$65,625	\$65,625	\$90,234.38	\$556,172	\$426,913	\$129,259
90	\$90,000	\$196,875	\$56,250	\$56,250	\$77,343.75	\$476,719	\$411,725	\$64,994
75	\$75,000	\$164,063	\$46,875	\$46,875	\$64,453.13	\$397,266	\$396,538	\$728
60	\$60,000	\$131,250	\$37,500	\$37,500	\$51,562.50	\$317,813	\$381,350	-\$63,538
45	\$45,000	\$98,438	\$28,125	\$28,125	\$38,671.88	\$238,359	\$366,163	-\$127,803
30	\$30,000	\$65,625	\$18,750	\$18,750	\$25,781.25	\$158,906	\$350,975	-\$192,069
15	\$15,000	\$32,813	\$9,375	\$9,375	\$12,890.63	\$79,453	\$335,788	-\$256,334

4.2.6 Scenario three: voucher-based dominant

This scenario assumes that 50% of Dryad’s members opt for the voucher-based funding option, only 25% each for the journal and pay-as-you-go based options, and an additional number of author-pays deposits equivalent to 25% of those made by members.

	Journal members	Voucher members	Pay-as-you-go members	Author-pays (relative % of deposits)
Percentage of total members	25%	50%	25%	25%
Avg journals/vouchers/deposits	1	50	50	

No. of total members in Dryad	Total membership revenue (\$)	Journal total income (\$)	Voucher total income (\$)	Pay-as-you-go total income (\$)	Author-pays income (\$)	Total annual revenue (\$)	Estimated annual operating cost (\$)	Funding gap (\$)
150	\$150,000	\$164,063	\$187,500	\$93,750	\$111,328.13	\$706,641	\$430,288	\$276,353
135	\$135,000	\$147,656	\$168,750	\$84,375	\$100,195.31	\$635,977	\$419,319	\$216,658
120	\$120,000	\$131,250	\$150,000	\$75,000	\$89,062.50	\$565,313	\$408,350	\$156,963
105	\$105,000	\$114,844	\$131,250	\$65,625	\$77,929.69	\$494,648	\$397,381	\$97,267
90	\$90,000	\$98,438	\$112,500	\$56,250	\$66,796.88	\$423,984	\$386,413	\$37,572
75	\$75,000	\$82,031	\$93,750	\$46,875	\$55,664.06	\$353,320	\$375,444	-\$22,123
60	\$60,000	\$65,625	\$75,000	\$37,500	\$44,531.25	\$282,656	\$364,475	-\$81,819
45	\$45,000	\$49,219	\$56,250	\$28,125	\$33,398.44	\$211,992	\$353,506	-\$141,514
30	\$30,000	\$32,813	\$37,500	\$18,750	\$22,265.63	\$141,328	\$342,538	-\$201,209
15	\$15,000	\$16,406	\$18,750	\$9,375	\$11,132.81	\$70,664	\$331,569	-\$260,905

4.2.7 Scenario four: pay-as-you-go dominant

This scenario assumes that 50% of Dryad’s members opt for the pay-as-you-go based funding option, only 25% each for the journal and voucher based options, and an additional number of author-pays deposits equivalent to 25% of those made by members.

	Journal members	Voucher members	Pay-as-you-go members	Author-pays (relative % of deposits)
Percentage of total members	25%	25%	50%	25%
Avg journals/vouchers/deposits	1	50	50	

No. of total members in Dryad	Total membership revenue (\$)	Journal total income (\$)	Voucher total income (\$)	Pay-as-you-go total income (\$)	Author-pays income (\$)	Total annual revenue (\$)	Estimated annual operating cost (\$)	Funding gap (\$)
150	\$150,000	\$164,063	\$93,750	\$187,500	\$111,328.13	\$706,641	\$430,288	\$276,353
135	\$135,000	\$147,656	\$84,375	\$168,750	\$100,195.31	\$635,977	\$419,319	\$216,658
120	\$120,000	\$131,250	\$75,000	\$150,000	\$89,062.50	\$565,313	\$408,350	\$156,963
105	\$105,000	\$114,844	\$65,625	\$131,250	\$77,929.69	\$494,648	\$397,381	\$97,267
90	\$90,000	\$98,438	\$56,250	\$112,500	\$66,796.88	\$423,984	\$386,413	\$37,572
75	\$75,000	\$82,031	\$46,875	\$93,750	\$55,664.06	\$353,320	\$375,444	-\$22,123
60	\$60,000	\$65,625	\$37,500	\$75,000	\$44,531.25	\$282,656	\$364,475	-\$81,819
45	\$45,000	\$49,219	\$28,125	\$56,250	\$33,398.44	\$211,992	\$353,506	-\$141,514
30	\$30,000	\$32,813	\$18,750	\$37,500	\$22,265.63	\$141,328	\$342,538	-\$201,209
15	\$15,000	\$16,406	\$9,375	\$18,750	\$11,132.81	\$70,664	\$331,569	-\$260,905

4.2.8 Scenario three: author-pays dominant

This scenario assumes that Dryad’s members opt equally for each of the three funding options (journal-based, voucher-based and pay-as-you-go), and that an additional number of author-pays deposits equivalent to 50% of these are made.

	Journal members	Voucher members	Pay-as-you-go members	Author-pays (relative % of deposits)
Percentage of total members	33%	33%	33%	50%
Avg journals/vouchers/deposits	1	50	50	

No. of total members in Dryad	Total membership revenue (\$)	Journal total income (\$)	Voucher total income (\$)	Pay-as-you-go total income (\$)	Author-pays income (\$)	Total annual revenue (\$)	Estimated annual operating cost (\$)	Funding gap (\$)
150	\$150,000	\$216,563	\$123,750	\$123,750	\$232,031.25	\$846,094	\$443,113	\$402,981
135	\$135,000	\$194,906	\$111,375	\$111,375	\$208,828.13	\$761,484	\$430,861	\$330,623
120	\$120,000	\$173,250	\$99,000	\$99,000	\$185,625.00	\$676,875	\$418,610	\$258,265
105	\$105,000	\$151,594	\$86,625	\$86,625	\$162,421.88	\$592,266	\$406,359	\$185,907
90	\$90,000	\$129,938	\$74,250	\$74,250	\$139,218.75	\$507,656	\$394,108	\$113,549
75	\$75,000	\$108,281	\$61,875	\$61,875	\$116,015.63	\$423,047	\$381,856	\$41,191
60	\$60,000	\$86,625	\$49,500	\$49,500	\$92,812.50	\$338,438	\$369,605	-\$31,168
45	\$45,000	\$64,969	\$37,125	\$37,125	\$69,609.38	\$253,828	\$357,354	-\$103,526
30	\$30,000	\$43,313	\$24,750	\$24,750	\$46,406.25	\$169,219	\$345,103	-\$175,884
15	\$15,000	\$21,656	\$12,375	\$12,375	\$23,203.13	\$84,609	\$332,851	-\$248,242

5. Risk Register

The below risk register has been updated from that included in the 2010 report Draft Recommendations for Dryad's Sustainability Planning from Charles Beagrie Ltd (<http://www.beagrie.com/publications.php>).

Risk	Probability (1-5)	Severity (1-5)	Score (P x S)	Action to Prevent/Manage Risk
Problems in building a critical mass of data within the repository	3	5	15	Mitigated by populating with targeted datasets and links to other repositories.
No growth in numbers of partner journals	1 (3)	5	5 (15)	Assumes marketing effort is contained in minimum viable staffing (or higher risk applies). Demonstrate benefit of partnership via existing partners.
Governance – poor buy in to model	1	4	4	Ensure continuing liaison with membership and other stakeholders to ensure governance model reflects their needs.
Difficulty recruiting members	2	3	6	Consult regularly with membership and other stakeholders to ensure that funding model is suitable for them.
Ability to recruit suitable executive staff	2	4	8	Ensure positions are well advertised and adequately funded.
Possible issues with hiring staff directly rather than through a parent organisation				Seek US legal advice to guide board on its responsibilities.
Continued support of host institutions	1	4	4	Demonstrate benefits of partnerships in terms of institutional priorities.
Difficulty obtaining funds for research and development	3	3	9	Move to non-profit status, and maintain partnerships with host-institutions.
Short term risk that IRS do not accept Dryad for non-profit status	1	5	5	Legal consultation.
Increased administrative	2	2	4	Ensure adequate

overhead associated with collecting voucher payments				staffing level.
Technical problems with delivering core functionality and stable platform	2	5	10	Thorough analysis of requirements, options and capabilities throughout development. Working with beta test Journals and “handshaking” repositories to identify and iron out any problems.
Inability to meet expectations of stakeholders/partners	2	5	10	Manage expectations – be realistic about what can be achieved. Identify clear milestones.

6. Summary

DryadUK played an integral role in helping Dryad to collect wide community feedback and to use this to develop a funding and governance models. These models have now been adopted, and look likely to prove successful in their uptake.

The successful implementation of these plans and adoption of non-profit status will require close attention to lessons learned, especially as the anticipated scale of memberships and deposits is realised. As mentioned in the 2010 report by Charles Beagrie Ltd., while fixed costs are significant on smaller scales, the variable costs will become more significant as usage grows, requiring close monitoring. As the diversity of Dryad’s stakeholders and associated publications is great, this report has included models representing a range of potential income scenarios for guidance.

Due to the planning and consultation process undertaken, Dryad is undoubtedly moving in the direction of becoming a well-supported and sustainable organisation. Despite this, its changing size, structure and complexity are also reflected in an increase in the risks it needs to prepare to deal with, to which close attention need to be paid. In particular a continuing relationship with a host institution and support from overseas organisations should be pursued.